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Precision SHOOTING

MID-WINTER BENCH REST SHOOTING AT THE CHEMUNG COUNTY ROD & GUN CLUB IN SOUTH-CENTRAL NEW YORK. THREE CLUBS IN THE AREA FIRE LEAGUE MATCHES HERE EVERY OTHER SUNDAY THROUGHOUT THE WINTER.

FEB. 6

a magazine for Shooters by Shooters

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SHOOTING CONDITIONS WERE A BIT TOUGH

You don't usually go around on snowshoes in Connecticut, but this winter the members of the Darien (Conn.) Rifle & Pistol Club, Inc. found they had to occasionally, to maintain unbroken their regular schedule of Sunday afternoon outdoor practice sessions. At left, Joe Rivers, president of the club, tries out a bit of business at 50 yards, wearing snowshoes and a pistol shooting mitt. At right, Bill Peterson, treasurer of the outfit, turdges over three-foot drifts to hang up some 25-yard targets.

BASIC RIGHTS AND RESPONSIBILITIES

Recently a subscriber, and frequent contributor of articles for publication, sent us quotations from the annual report to its stockholders of a major corporation, of which one of our major arms and ammunition manufacturers is a division. A particular quote from that report, which our correspondent stressed as important to all shooting people, was:

"The importation of obsolete military firearms from abroad continued (in 1960) **at a high rate. The company and other manufacturers of sporting arms and ammunition are urging the Government to impose limitations on the mass importations of these surplus rifles which are sold at only a fraction of the cost of the Division's high quality sporting firearms."**

Both personally and editorially we uphold and respect the basic rights of individuals and organizations to their own beliefs and opinions, and (in this country at least) to the right to publicly express, and to try to influence others to those same beliefs and opinions. We further uphold and respect the rights of those with opposing beliefs and opinions to express, defend and further them, and applaud them for so doing, vigorously.

In this case, we hold to the right of the individual to free choice of what he wants to purchase, so long as it is a legitimate item and he can pay for it, and this in spite of the fact that we personally do not consider the greater part of the obsolete military weapons that are being imported for sale to U. S. shooters to be any great bargains.

The arms and ammunition manufacturers have their group trade organization, the Sporting Arms and Ammunition Manufacturers Institute, which serves as both a public relations and lobbying organization. The U. S. shooters have their National Rifle Association which can serve (and has effectively served) as their group representative in matters of national policy and legislation. They have their local and state organizations to serve as group representatives in local and state matters. When the shooters and "The Trade" have differences of opniion (and for the good of all, major differences should be infrequent), each group is prepared with means to present, defend and further its objectives.

A BASIC RESPONSIBILITY for every individual shooter is to make known his beliefs and opinions to the shooting organizations of which he is a member, and to the elected representatives in the appropriate government legislative bodies. It is a further responsibility for the individual shooter (and hardly a secondary one) to maintain membership in the shooting organizations, local, state and national, which are prepared to represent his interests in matters pertaining to his sport and hobby, when the hour of need arises. That is simply keeping in force insurance policies with a darnd cheap premium cost.

PHT

A "CORRECTION" AND INFORMATION

Dear Phil:

I want to correct an error in the Information Bench—Mr. Lathrop's answer on ISU rule for shooting coats. I gave him the wrong information on padding. The single-thickness maximum is 10mm, **NOT** 8mm. Thickness doubled is 20mm (approximately ¾ inch), when "lightly compressed." Padding must be on outside of coat.

I was evidently thinking of the scoring plug when I gave the 8mm figure to Mr. Lathrop. All bullet holes at 300 meters are gauged with an 8mm plug, regardless of the caliber used. Actually the gauges are 6mm, 6.5mm, 7mm and 7.5mm, but all have the 8mm scoring flange.

The "Judge" in an ISU match corresponds to NRA referee, but has wider powers in rule interpretation, can make immediate decisions affecting the match in progress, etc. A few years ago in an international competition, the judge ruled that finger grooves in pistol grips and palm rests were "an orthopedic advantage contrary to spirit of the competition"—the boys did a lot of whittling immediately.

Roy F. Dunlap

GUN DIGEST TREASURY

Editor John Amber has done a fine job of selecting material from the first fifteen editions of the GUN DIGEST to include in the 384 pages of the new GUN DIGEST TREASURY.

The material in the book covers just about every phase of the gun hobby field. There will probably be very few who will find everything in the book of absorbing interest to them, and even fewer who won't find more than a little of real interest to them. Some will complain because there is too much space devoted to obsolete arms and the collecting field, while others will complain that there isn't enough. Some will be "cold" to the 78 pages devoted to European proof marks, while some will consider having all that information brought together in one place for ready reference is alone worth more than the $3.95 price of the book. But there is a lot of good information on modern arms, shooting, handloading, etc. There is good reading in the book for anyone who has any interest in guns of every type. A valuable feature of the book, and alone worth the book's cost, is the large amount and variety of reference material, brought together in one place where it can be easily found when wanted.

A "bonus" with the book is a reprint of the firearms section of a Sears Roebuck & Company sporting goods catalogue for the year 1902. That will be an historical item for younger readers, but they won't be able to evaluate the prices of that era. It may bring a little nostalgic memory to some of us who have been around quite a spell, but when we consider the true values, the time it takes to earn the money to pay for a purchased item, we'll have to admit that today's prices, in today's conditions, are not out of line with those of an earlier day.

You can probably buy the GUN DIGEST TREASURY locally, but if not it can be had from the publishers, The Gun Digest Company, Chicago 24, Illinois.

PHT

HANDGUN NEWS

According to recent news, handgunners will soon have two new "red-hot" cartridges in the real varminter class, and guns to shoot them in.

In the March U. S. HANDGUNNER, official magazine of the U. S. Revolver Association, (like P. S., received the first week in April), editor Stan Sprague writes about getting a first viewing of a new .22 Magnum cartridge and gun for it at the Smith & Wesson plant.

Stan describes the new cartridge as looking like a .38 Special necked down to take a 40 grain, soft nosed, metal jacket bullet of .22 caliber. It is said that the new round has a muzzle velocity of about 2500 fps from the revolver.

An unusual feature of the gun for this cartridge is that chamber sleeves are provided to permit shooting .22 rimfire cartridge. Two firing pins and a simple toggle arrangement on the hammer permit a quick shift from center fire to rim fire with a flick of the end of your thumb.

No mention is made of when this new cartridge and gun may appear on the market.

Then, just as we are trying to button up this issue, comes a Winchester-Western "news release" of the first showing at the National Rifle Association convention of the 256 Winchester Magnum handgun cartridge, which is expected to be in the hands of dealers by mid-summer.

This new .25 cal. round with 60 grain bullet is said to have a muzzle velocity of 2200 fps and muzzle energy (from 8 inch barrel) of 650 foot pounds. It is also stated that three manufacturers (Colt, Smith & Wesson and Sturm, Ruger & Co.) plan to chamber guns for the 256 Winchester Magnum cartridge.

(Provided these new cartridges are as good as they promise to be, if they don't win a near future handgun popularity contest I'll be proven an awful poor guesstimator. PHT)

.308 NORMA MAGNUM CARTRIDGE

NORMA-PRECISION, South Lansing, New York, have announced that loaded cartridges for the .308 Norma Magnum will soon be available, in addition to the unprimed cases for this caliber.

Reloading dies for the .308 Norma Magnum, for which .30-06 rifles may be rechambered to, are available from leading manufacturers, and rechambering reamers for magnumizing .30-06 rifles are also sold by top makers.

Complete information on this caliber, cartridges and unprimed cases may be obtained by writing to NORMA-PRECISION, South Lansing, New York.

WE SLIPPED AGAIN

A reader has commented: "Wouldn't be surprised if some of the old timers have jumped on you for the remark about 'Beginning of competitively shooting rifles from bench rest some 15 years ago.' Seems to me there was pretty keen interest in matches 'way back when' at the Walnut Hill Range, for one place. Gould's book of the 1890's shows or gives dimensions of the target used (at 200 yards. They felt less than 200 didn't show the worth of the arm). The target was one in regular use for some other shooting, to which an 11 and 12 ring were added within the 10 ring."

We did slip on that one. Knew better but inadvertently omitted the words "present day" before the words "competitively."

Shooting a rifle from rest (of some type) in competition certainly is not new. We do not know just how far into the past it does date back to. We do feel reasonably sure that early "shooting from rest" competitions differed in the conditions of shooting in different localities. The "present day" program for competitive bench rest shooting, with conditions standardized throughout the country, has been developed since the close of World War II.

The "present day" program of bench rest shooting had its beginning with the matches conducted by the Puget Sound Snipers Congress in Seattle, Washington, followed by publicized matches in New York and Pennsylvania, the organization of the Eastern Bench Rest Shooter Association in 1947, and expanded nationally with the formation of the National Bench Rest Shooters Association in March 1951.

PHT

MAINE PISTOL CHAMPIONSHIPS
NRA REGISTERED
JUNE 3 and 4, 1961 at BLUE HILL, MAINE
SILVER AWARDS IN 2700 GRAND AGGREGATE
Awards in all classes in all matches
Programs: George Scott, Scott's Twin Acres, Northport, Maine (via Lincolnville)

HOLLOW POINT BULLETS ON GAME

EXPERIENCE REPORTS

From Harry Jackman, Arcadia, California:

With reference to your article on hollow point bullets on game; I killed two large mule deer last October, using the Sierra 168 grain open point International bullet ahead of 69 grains 4350 in a .30 Newton. The gun was built for me several years ago by Chandler in Detroit. This load chronographs 3030 fps in my gun.

I had been somewhat worried as to whether this bullet would open up, but it worked perfectly on these two deer. The larger one was coming toward me about 50 yards away; he was hit head on, high in the chest, the bullet cutting through three or four ribs about six inches away from the spine. I noticed no exit hole in skinning him. The second deer was hit in the neck at about 75 yards, and the bullet left a hole I could put my fist through. Both animals were killed instantaneously, dead before they hit the ground. I don't know how much they weighed, other than that the total meat weighed 205 pounds three days after being skinned and quartered, heads, hide and feet removed and bloodshot meat discarded.

I believe that, at 3000 fps, the Sierra .30 International bullet will perform adequately; whether it would do as well at lower velocities is another question.

From Edward S. Burrell, Cambridge, Maine:

I was interested in your article in the February issue re. hollow point bullets. Prior to moving up here last April I lived in Penna., my native state, and a few years in New Jersey. Did quite a lot of groundhog hunting there. In 1959 I started off with a new BSA caliber .222 and soon settled down to a load of 20.5 grs. 4198 and Jordan 50 gr. soft swaged bullet. This load was the best I could find for accuracy. I would say from 150 yards or less it was an excellent killer. Beyond 150 yards about half of the chucks would make the hole but could usually be reached and hauled out.

I traded that gun off for a Model 70, cal. 220 Swift, standard barrel job that belonged to a friend. It had already had 3000 rounds fired through it but I had the privilege of trying it out or no deal. Again, the same bullet was the best, using 37.5 grs. of 3031. Have killed about 40 chucks with it and all were dropped on the spot. Exit holes were about 1 inch diameter. I also shot 5 with factory soft points. They almost cut the chucks in half! While there was no explosive effect to the Jordon bullets, they certainly killed instantly at Swift velocities.

OTHER BULLET COMMENT

From Byron Cottrell, Galeton, Pa.:

. . . . . Now, Phil, about those hollow point bullets expanding in game that you mentioned in the February issue; I have considered for years that the thickness of the jacket was the important part of a game bullet. If it is thin jacketed it will open up plenty regardless of whether it is soft point or hollow point. If it is a heavy jacket—really heavy—I believe it will open with greater reliability if it is soft point. In a hollow point it is more of a punch and cuts through more without opening; of course, what it hits has a lot to do with it.

Around twenty-five or thirty years ago a bunch of shooters that worked in F. A. did quite a bit of experimental work on the Government 173 gr. B. T. bullet. They found if the point was drilled it did not open well, or at all unless the range was very close. But if the point was split with a single cut of a small, thin hack saw just ¼ inch, and no more, it would open very reliably even at long range, and it would not blow up at close range. I have seen many deer and woodchucks shot with this bullet at all ranges up to 700 yards, and they worked. Also, the bullet shot the same as when unaltered, even at 1000 yards.

(Continued on Page Fourteen)

COMING MATCHES

(We will list place, date, type and title of match, name of sponsoring organization, name and address of contact person, at a nominal flat rate of $2.00 per insertion, prepaid with insertion order. Insertion orders must reach the Precision SHOOTING office, 64 Depot Street, Lyndonville, Vt., at least 45 days before date of match for single insertion orders. For multiple insertions, 30 days additional must be allowed for each additional insertion desired.)

ALBANY, NEW YORK: Forbes Eighth Annual Long Range Rifle Tournament, July 29 and 30, 1961. Donald W. Winne, 20 Frederick Ave., Albany 5, New York.

MAINE .30 CALIBER RIFLE MATCHES
JUNE 11, 1961 at HAMPDEN, MAINE RIFLE & PISTOL CLUB
Awards in Military, Civilian and Junior Category
All matches at 200 yards. Camp Perry try-outs for Maine Civilian residents.
All are welcome.
Programs: Paul M. Beegel, 80 Goff St., Auburn, Maine

IN CALIFORNIA . . .
Tune up your deer rifle, your bench rest rifle, your target rifle and yourself at the
HUTTON RIFLE RANCH . . .
Official Range of GUNS and AMMO magazine
20 Covered Bench Rests with Spotting Scopes
Midway between Highway 101 and 101-A, in
Topanga Canyon, near Santa Monica, Calif.

ADVANCED TECHNIQUES OF RIFLE POSITION SHOOTING

Presented by The United States Army Advanced Marksmanship Unit of Ft. Benning, Georgia

This is a manual on position shooting designed to assist gallery and outdoor position match competitors, coaches and trainers in their efforts to develop rifle shooters of championship caliber. The secondary purpose is to teach techniques peculiar to Free Rifle shooting in International competiiton for those interested in this more difficult undertaking. The material for the most part **deals with new and improved methods used to apply fundamental principles**, and to this extent will be of interest to all rifle shooters. Experienced coaches and teachers will find it useful as a supplement to their manuals on basic instruction, particularly in teaching beginners who show unusual aptitude and the ability to learn quickly.

The material presented contains what is believed to be the best techniques for rifle shooting yet developed. This belief is supported by the fact that they are used by the best rifle shots in the world. Readers will notice that most fundamental principles presented are not new. The intent of the manual is to review and, in some cases, restate these fundamentals and to offer improved methods and techniques with which to apply them.

(Our copy of this material is supplied by Ozzie J. Mazzetta, Libertyville Gun Club (Illinois). It is being presented in two parts; that portion dealing with "positions" herewith and the portion dealing with "sighting and aiming" to follow in May.)

POSITIONS

1. **General:** To properly serve its purpose, each shooting position must satisfy two fundamental requirements; first it must produce a satisfactory hold, and second it must permit the body to function efficiently.

A. **Hold:** By definition, **a satisfactory hold is pointing the rifle in such a manner that its sights remain in proper alignment with the target for a sufficient length of time to permit the application of a correct technique in firing it.** The hold produced by a position is judged according to its two prime characteristics, degree of steadiness, and the length of time the period of maximum steadiness lasts. The relative merit of the standing hold for example is, therefore, initially determined by the time factor, if the steadiest period (shaky as it is) lasts long enough for the shooter to get the shot away without jerking the trigger, it may be a good hold; conversely though the steadiest period be motionless, if it does not last long enough for the shooter to fire the shot without disturbing the aim, the hold is unsatisfactory. Obviously, the shorter the period of time required to properly manipulate the trigger, the easier it is to find a satisfactory hold. This approach to learning to shoot, that is, shortening trigger manipulaiton time rather than lengthening hold time, is the most common cause of bad shooting. The proper approach is to develop a position which produced steadier holds enduring for longer periods. This will establish a condition in which the difficult art of correct trigger manipulation is more readily learned, and which is also conducive to more precise aiming. The difficult and complex coordinated acts which must be perfected in learning to shoot well are controlled by the hold, which is essentially what the shooter sees through his sights. It is therefore vital that the position which produces the hold be near-perfect as judged by the hold before these coordinated acts can occur in proper relationship to one another. Thus, the hold the position produces is the first consideration in position development.

B. **Efficient Body Function:** Mention was made above concerning acts which must be coordinated correctly to produce an accurate shot. Positions should establish body postures which not only permit the body to perform these acts, but are conducive to performing them in perfect coordination. Normal body functions such as breathing, heart action, blood circulation etc., must occur while shooting, unhampered by the position. For example, a prone position in which the weight of the torso rests on the lower portion of the rib cage is incorrect if breathing is restricted because shortness of breath will seriously effect shooting. Also, a standing position in which a part of the weight of the rifle is supported by one muscle group is incorrect because the delicate coordination required of such muscles in pointing the rifle will deteriorate and destroy the hold, as the muscles weaken with fatigue. All positions should be bone structure and ligaments which can perform this function with little or no assistance from muscle groups. This tends to free the muscles of support loads, which being of a continuous nature cause them to tire, and permit them to be used under intermittent loads in the more suitable tasks of providing stability and immobility. One point deserves special emphasis here. All muscles are used in all positions, either actively engaged in stabilizing or immobilizing some part of the body-rifle unit or **passively engaged in being totally still and relaxed.** Such a positive approach to the task of controlling relaxed muscles is the first step in preventing the violent reactions which sometimes occur as a shot is fired, spasmodic or sympathetically stimulated responses in such muscle groups are usually the culprits when this happens. Giving special attention to these passive muscle groups in position training provides them with the practice they need in learning not to respond to the stimuli reaching their active neighbors.

2. **Prone Position:** The excellent weight supporting capabilities of the combination of left arm and sling and the fact that the position is close to the ground on a very large support area and the lack of any need for muscular effort in pointing the rifle combine to make prone the steadiest position. These characteristics almost automatically produce what appears to be ideal conditions in which to fire with very little effort. The shooter frequently fails to recognize the insidious nature of certain conditions which usually cause bad shots prone, believing that the existence of a nearly motionless hold can only produce shots within the small area on the target covered by the movement he sees. Every long string of tens fired reinforces this belief and obscures the fact that the one or two shots "Just Out" indicate that he is intermittently, at least, doing something very wrong. Detecting errors that are traceable to position and suggesting corrective adjustments will therefore be discussed.

A. **Pulse:** The familiar pulse beat produced as the heart pumps blood through the arteries is a matter of much concern to the shooter, since it causues repeated uncontrollable movements of the body which appear as visibel oscillations in the hold. Reducing the amplitude of these oscillaitons is accomplished by insulating critical areas of contact between body and rifle and by avoiding application of pressures near certain larger arteries. The sling loop is placed low on the left arm near the lower end of the biceps muscle and is pulled only tight enough to stay in place. A tightly adjusted loop applies pressure to the artery in the arm and permits it to transmit the pulse beat through the sling directly to the rifle. Because the sling loop is the primary source of pulse oscillation, the use of several sweat shirts, sweater or shirts under the shooting jacket will cushion or soften the effect of unavoidable pulse. Proper adjustment of sling loop will be ineffective if sling length is improper since a length must be only short enough to support the forward weight of the rifle at the desired height above the floor. Any tendency to apply heavy pressure to the rifle butt with the right shoulder should be avoided since it has the same effect as a short sling adjustment. When the position is built flat on the floor, the weight of the upper body and rifle is supported by sling and arms on the elbows and by the lower portion of the rib cage. In this position, the downward curve of the spine tends to press the largest artery in the body (aorta) and will frequently transmit a very heavy beat to the upper body. For this reason and others discussed later, the right leg should be pulled up slightly with the right knee bent. This lifts the right hip from the floor and rolls the upper body slightly on the left side, greatly lessening the possibility of a beat caused by the aorta. The rifle butt should be placed well in on the shoulder, close to the neck. Contact between stock and neck however must be avoided to prevent pulse from arteries there being transmitted to the stock. Tight clothing, particularly in the waist, shoulders, and arms can often produce oscillations because the strong material of a shooting jacket when under strain can transmit movements from the body areas not normally considered a source for this difficulty. The entire problem of pulse-elimination cannot be solved by the above, but application of these methods should reduce it to within acceptable limits.

B. **Hold:** In the prone position with iron sights, the movements of the rifle as seen through the sights should be so small as to be barely perceptible. This condition should last for at least ten seconds. An experienced iron sight shooter will frequently check his prone hold with a telescopic sight. Telescopic magnitfication clearly shows magnitude, direction and speed of each movement, enabling him to see the results obtained with each minor variation in position. Needless to say the cross-hairs oscillate constantly, but correct position and practice will reduce the movement to one-half ten ring or less on the gallery target. There is no substitute for thorough and repeated study of the hold, since its characteristics will always furnish visible evidence of position errors and clues to their correction.

C. **Efficient Body Function:** The position in which the body is rolled slightly on the left side and held there by the bent right leg has certain advantages in addition to pulse elimination already discussed.

1. Breathing is improved because the right side of the rib cage is free to expand, and the diaphragm region is less restricted. The importance of correct breathing prone deserves emphasis in view of the fact that the common tendency to hold the breath longer while shooting prone will cause an oxygen deficiency in the system unless the shooter takes several slow deep breaths between shots to replace oxygen losses due to holding. This position makes deeper inhalations possible with less effort, contributing therefore to the prevention of oxygen deficiency.
2. The weight of the upper body and rifle are supported almost entirely by the left arm and sling (a disadvantage until the left arm becomes accustomed to the heavier load) allowing the muscle groups of the right upper chest, shoulder and right arm to be "passively engaged," as previously discussed. The firm support phase of the prone position will cause the movements of muscles in this area to be magnified as they are transmitted directly to the rifle. Near total relaxation of these muscle groups therefore contributes to the over-all efficiency of the position.
3. Relieving the right arm of its support load contributes to manual dexterity of hand and arm in reloading, adjusting sights, writing in scorebooks, etc.
4. The slightly higher over-all position (Required by International Shooting Union Rules for International Competition) makes possible a more erect head position on the stock. This established an improved condition for the eyes to do their work in sighting. The reasons for this are discussed later under the heading "Sighting and Aiming."

D. **Position Orientation:** Failure to adjust the entire position so that the natural point of aim coincides **exactly** with the target to be fired on is the most common as well as the most serious mistake made prone. Gallery shooters in particular because they usually fire only one shot per "bull" will orient the position properly to shoot on the sighter bull and muscle the rifle around the target for the record shots. No muscle tension is required prone, and there should be none. Position orientation means adjusting the body and rifle as a unit so that no muscle tension is present anywhere when the sights are in perfect alignment with the aiming mark to be hit.

3. **Kneeling Position:**

A. **General:** Recent developments in shooting techniques have resulted in basic changes to the kneeling position. The application of these new principles allow a shooter to stay in position easily and shoot accurately for as long as two hours with stability comparable to that found prone and sitting. The support area is smaller than that of the prone or sitting and the center of gravity is located much higher above the ground. The rifle is supported by the left arm, as in the other positions, however the arm itself is in turn supported by the left knee which is some distance above the ground. The flexibility of the ankle joint may thus render the whole support system unstable. According to the proven and accepted modern idea, a kneeling position, to be considered good, must satisfy three basic requirements:

1. The weight of the body must be distributed in such a manner that the left leg supports a minimum load.
2. The moveable parts of the body must be made rigid with the least muscular effort.
3. The head must be placed in such a position that the eye has a favorable condition in which to perform its work.

B. Kneeling positions which satisfy these requirements have certain basic physical features. The right leg is turned away from the plane of fire at an angle of 75 degrees to 80 degrees. The left leg is placed so that the shin bone is nearly vertical. The left foot is turned at an angle of 40-60 degrees to the plane of fire. The center of gravity is placed not in the center of the support area where the weight would be distributed evenly on the three support points, but instead is placed at the extreme left rear of the support area. This places maximum weight upon the right foot supported by the kneeling cushion and minimum weight upon the right knee, left arm and leg. This shift of weight to the left rear tends to relieve the muscles of the left arm and left leg of much of the weight of body and rifle and the leg becomes a relatively steady support for the left arm and the rifle. This is most important.

C. To keep the maximum weight upon the right foot, it is necessary to hold the torso in an erect position. Any inclination of the body to the right or to the front will shift the weight of the body to the right knee or left leg. The erect torso position leads naturally to an erect head position which makes the work of the eye in aiming more effective. A placement of the head with only a slight downward tilt usually provides the best eye position and avoids strain in the neck muscles. When changing from the prone or sitting position to the kneeling, the fore-end stop should be adjusuted far enough to the rear to raise the rifle somewhat and prevent the excessive downward tilt of the head.

D. The angle bewteen the shoulders and the left arm must be 90-100 degrees. The left elbow should be located under the rifle or slightly to the left of it. The sling is placed lower on the arm than in the prone and should not be drawn too tightly about the arm. The right arm should be relaxed and the right hand should grip the small of the stock with only sufficient effort to hold the hand in place. The index finger of the right hand must not touch the stock at any point.

E. After the kneeling position has been assumed, the shooter must check to see that his rifle points naturally at the target (the natural point of aim). If the rifle is pointed to the right or left of the target, the shooter must rise slightly and shift his whole body as a unit. Any attempt to move the left or right leg only will destroy the unity of the position, resulting in a condition much the same as occurs when a bridge girder is out of line. If the rifle tends to point above or below the target, a correction can usually be made with the rifle only. With the free rifle, the adjustable butt-plate may be raised or lowered. On rifles without this feature, the rifle butt itself may be placed higher or lower on the shoulder. The length of the leather sling may be changed slightly.

4. **Standing Position:** Because the center of gravity of a man and rifle in the standing position is high above the support area, and since the support area itself is relatively small this is the most difficult and complicated position. Also the act of stabilizing or immobilizing the body and the rifle while pointing it requires considerable muscular effort. The rifle is a comparatively heavy object and when being aimed, has a center of gravity or balance point at some distance from the center of balance of the standing body. Obviously, one who stands erect must support the forward weight of the rifle by muscular effort which is not only very unsteady, but extremely tiring. Therefore, in constructing the position, conditions must be established in which the body and the rifle are, to the greatest degree possible, supported by bone structure and ligaments so that the muscles can be used efficiently to provide immobility.

A. **Torso Displacement:** First of all, the torso must be displaced to the right and to the rear sufficiently to counterbalance the rifles weight. In this position, when viewed from the side, the axis of the hips are well forward of the axis of the shoulders and the rifle is directly over the hips. When viewed from the back, the transverse axis of the hips is some distance left of the transverse axis of the shoulders and the balance point of the rifle is very nearly directly over the left hip. This arrangement places the center of gravity of the combined system of torso and rifle directly over the pelvis and support by bone structure and ligaments is achieved.

B. **Body Twist:** There remains however, one serious deficiency in that the torso and rifle tend to oscillate horizontally, a condition normally beyond the capabilities of available musculature to prevent. Bone structure and ligaments can again be used to assist in correction of this fault by twisting the torso to the left, that is by turning the torso counter-clockwise on its longitudinal axis. This permits most effective use of the powerful abdominal muscles in providing immobility for the torso and creates greater rigidity in the leg joints. Such arrangement of the upper body also establishes conditions ideal for proper use of the left arm.

C. **Left Arm and Hand:** If body conformation will permit, the left elbow must be supported by the hip bone (crista iliaca of the pelvis) or lie slightly right of it, and the forearm must be as near vertical as possible. In its proper function, the left arm acts only as a prop or bracket between hip and rifle, supporting the weight by bone structure alone. Relaxation of arm and shoulder muscles is now possible, and is proper if these muscles are not required to immobilize the arm. There are two workable solutions to the problem of determining the most advantageous use of the left hand on the palm rest. The Russian authority, Mr. A. A. Yor'yev, in his comprehensive book on free rifle shooting, recommends holding the palm rest so that the weight is nearly centered in the palm, wrist bent back so that the weight is sup-

ported by the ligaments of the wrist. In his view this also creates the most favorable conditions for holding the left arm as a whole rigid. The other solution is to place the hand on the palm rest so that the weight of the rifle is transmitted into the heel of the palm and in direct line with the forearm and wrist. In this arrangement, the wrist is bent 45 degrees or less and the hand is relaxed against the ball of the palm rest. Because any tendency to influence the aim with the left hand is bad, this solution, with its relaxed hand is preferred, particularly by shooters who encounter this difficulty.

D. **Hips, Legs, Feet:** In order to construct the most efficient position for hips, legs and feet it is necessary to refer again to the center of gravity of the entire body and rifle, striving to locate this point as nearly as possible over the center of the support area outlined by the feet. Obviously, the weight must be carried equally on both feet to do so. Many men still prefer the familiar hip slung position with most of the weight supported by the left leg. For some very tall or lean men this is in fact the best position, but for the average person it must be avoided. The load carried by each leg passes through the center of the foot or slightly more toward the ball of the foot. Place the feet not quite as far apart as the shoulders are wide, and point the toes out slightly. This is important in that the bone structure of the foot when so placed best supports the load it carries. Much of the position's stability will depend upon the proper degree of strain placed on the muscles and ligaments which hold the knee joints rigid. Keep the knees straight without stiffness as opposed to being locked back or bent forward. The coordinated work of the leg muscles in holding the body steady (without swaying) is enhanced when both knees are straight, and by their interaction materially assist in holding the knee joints rigid. The torso position previously discussed causes the hips to be well forward. The resulting bow or curve of the body between shoulder and knee places an even strain on a structure of ligaments between those two points which will prevent locked knees.

E. **Head Position:** When the rifle is properly positioned with regard to the body, the top of the cheek piece of the stock will be about ¾" lower than the bottom of the cheek bone and about 1" to the right as measured with the head held erect and turned toward the target. Eye relief (Distance between right eye and rear sight when aiming) should be at least 3" and is normally slightly greater than in the other positions. When the head is properly placed on the stock in aiming the shooter should feel no strain on the neck muscles and the eye should be looking nearly straight ahead through the sights—that is, not looking over the nose or just under the brow. Both eyes must be well open and relaxed. Block the view of the left eye if necessary, but keep it open. In this way, the right eye will see better and will not tire so quickly.

F. **Training:** For each man, the development of the standing position that suits his body conformation best will take four to five times the effort, thought and practice time required to develop the other positions. The best standing shooters learned how by holding and dry-firing every day if only for five minutes at a time. The many sets of muscles used to stabilize the body and rifle must be strengthened and rehearsed in the complicated coordination required of them to hold the rifle still on the target long enough to shoot.

(Part 2, dealing with "sighting and aiming," will follow in May.)

TOURNAMENT CIRCUIT

NEW YORK GALLERY TOURNAMENT

The Eleventh Annual Edison Gallery Rifle Tournament, fired in Brooklyn, February 10 through 13, drew a total of 155 competitors.

The four-man team match, for 10 shots in each of the four positions and "Any Sights" permitted, was won by the St. John's Rifle & Pistol Club, an Expert class team shooting iron sights, with a score of 1556. A Roslyn Rifle Club team, Master class and shooting "Any Sights," was second with a 1554. A Manhassett Musketeers Master class team was third with 1547, though T. Kennedy's 397 was the highest individual score fired for this course during the tournament and his 97 standing score was only equaled by two other shooters; R. Dornau and E. Veigl.

E. Veigl was the outstanding individual shooter, placing second in the 20 shots in each prone and standing Any sight match with a 391 to winner R. Dornau's 392; second again in the prone-kneeling-standing Iron sight match but with the same course score as winner R. Truesdell (289), and then won the four position any sight match, again on a tied course score but his 97 standing a point better than runner-up Sam Burkhalter's standing score.

Burkhalter was runner-up in the three-match aggregate, seven points behind Veigl's winning 1073. W. Ryan, a junior shooter and top scorer for the winning St. John's team, was a point behind Burkhalter's 1066 for third place. F. Simmons was fourth with 1061, R. Dornau and E. Truesdell took fifth and sixth spots, each with a 1060 aggregate.

METROPOLITAN FIFTY SHOT CHAMPIONSHIP

The annual Metropolitan Rifle League "50 Shot Championship" was fired in Brooklyn on February 12th with 70 competing. This match has been fired annually since 1921 and, with the exception of one or two war years, has always been shot with smallbore rifles, Any sights, at 100 yards, indoors.

Six shot 500 possible scores this year. The target presently used for this match has smaller scoring rings than the official NRA decimal target and Ransford Triggs' winning score of 500-46x is a record score on this reduced target. Others shooting "possibles" were; Laurence Moore 500-42, Walter Tomsen 500-41, Fred Cole 500-41, Irwin Tekulsky 500-38, and E. Clausen 500-34.

CALIFORNIA ISU COURSE TOURNAMENT

The Fresno Rifle & Pistol Club conducted an International course rifle tournament on March 4th and 5th with 28 competing in the 300 meter events on Saturday and 31 in the 50 meter events on Sunday.

The 300 meter shooting was in four divisions; Miiltary Service free rifle, Service target rifle, civilian free rifle and civilian target rifle. The half-international course was fired, 20 shots in each of the three positions.

Winner in the Service free rifle division was Sgt. James Hill, USMC, with course total of 557-8x (195-4 prone, 194-3 kneeling and 168-1 standing). Sgt. Lewis Scoggins, USMC, had 543-6 and Lt. Robert Maguire, USMC, 538-12.

For Service target rifle it was Charles Wiseman 485-6, Clyde Morgan 423-1 and Casimur Snowadski 419-1, all from Vandenberg AFB.

Chris Petersen, Albany, was civilian free rifle winner with 546-6 (189-4 prone, 183-2 kneeling and 174-0 standing). Ken Cummins, Sebastopol, was second with 521-5 and Virgil Corbin, Berkeley, third with 519-5.

Civilian target rifle winner was Joe Specht with 481-3, followed by Kenneth Hayes 475-4 and John Shirinian 466-4, all Fresno shooters.

At 50 meters with smallbore rifle the full ISU course of 40 shots in each position was fired. In the Service free rifle division it was again Hill the winner with a 1139-21x score (397-10 prone, 376-6 kneeling and 366-5 standing). Scroggins was second with 1088-7 and Maguire third with 1087-7.

Civilian free rifle winner was again Petersen with 1100-13. Robert Wood, Ukiah, was second with 1089-7 and Ken Ccmmings third with 1079-11.

Civilian target rifle winner was Vernon Real, Madera, with 1063-7. Lyn Taylor, Oakland was second with 1049-8 and Henry Wrigh,t Fresno, 1046-8, third.

BIGGEST GALLERY RIFLE MATCH

The Connecticut Rifle & Revolver Association again backed up its claim for conducting the biggest gallery rifle tournament with a total entry of over 1500 shooters; 535 senior competitors and some 985 juniors and sub-juniors; on the weekend of March 10-11-12. The course of fire for seniors is five shots in each of the four positions with any sights, just one match. Juniors fire ten shots prone and ten standing, but juniors may also fire as a member of a senior team. Sub-juniors fire twenty shots prone. It is essentially a team match (four man teams) and the score in the team match also counts for individual high scores.

With over 100 teams entered in the senior division, competition is naturally very keen. The Magnum "Blue" team of K. Yetter, H. Allen, E. Avery and J. Yetter were high-over-all and Connecticut champions with their 772 score. The Bridgeport "Orange" team of Marshall Kidder, Frank Voytek, Albert Metzger and Joseph Diaz, Jr. were second with 771, and Roslyn Rifle & Revolver Club (New York) team of E. Enrich, R. Truesdell, F. Cole and F. K. Eichler, third wtih 770. Middlefield "A" team had 769 and Lakeland 768.

Richard Currie, shooting on the 10th place Westerly, Rhode Island team, was high individual with a 197 score. Sam Burkhalter, shooting on 9th place Cos Cob, Conn. team, had another 197 score but a 48 standing to Currie's 49. High woman was Virginia Williams of Rippowam with a 193.

Topping a 163 team field, the Middlefield Juniors team was high-over-all and Connecticut champions with a 742 score. Roslyn R. & R., New York, was second with 739, and LaSalle Academy, Rhode Island, third with 732.

C. E. Lyman IV, Middletown High, was high individual junior with 191. R. Vanderhyde, Roslyn R&R, was second with 190, while Pete Pierson, Wilbraham Academy and Joe Riberts, LaSalle Acad-

Winners in the International Course rifle matches fired at Fresno, California, March 4th and 5th. Left to right are: Cpl. Jerry B. Tamlin, USMC; Sgt. Lewis Scoggins, USMC; Sgt. William Rose, USMC; Henry Wright, Fresno; Lt. Robert Maguire, USMC; Sgt. James Hill, USMC; and Bob Perkins, Fresno.

emy, were tied at 189. Nancy Hancock, high scorer on the winning Middlefield team, was high girl with 189.

San Diego Military Academy (California) had high sub-junior team scoreof 792 and R. Duckworth of that team fired the only 200 possible score. Stratford PAL, Conn., was second with 786.

MID-WINTER PISTOL CHAMPIONSHIPS

Army Advanced Marksmanship Unit shooters from Fort Benning, Georgia, won four of the five top places in the National Mid-Winter Pistol Championships, fired at Tampa, Florida, and ending March 25th. A field of over 450 Armed Forces, Police and Civilian shooters competed.

SFC William B. Blankenship won the individual championship with a 2637-122x score. Ranking 2nd through 5th were: M/Sgt. Richard M. Stineman, AAMU, 2634-128x; SFC Samuel W. Hunter, AAMU, 2620-112x; T/Sgt. William L. Mellon, USAF, 2620-104x; and SFC Robert L. Jones, AAMU, 2615-94x.

Army "Gray" team won the .22 caliber team match with a 1172 score, Army "Blue" was second and U. S. Air Force was third.

Army "Blue" won the Center Fire team match with a 1164 score, Army "Green" second, Army "Gray" third and Air Force in fourth place.

The Air Force team, firing 1175, won the .45 cal. championship, with Army "Gray" second and Army "Blue" third.

The Army "Blue" team won the team aggregate with 3488, Army "Gray" second and the Air Force team third.

CONNECTICUT RIFLE LEAGUE

In defeating Cos Cob for the second time in a Southern Connecticut Rifle League match, Rippowam's Martha Ventres fired a 198 score for the five shots in each of four positions course of fire to give her a triple record. The score is an all-time woman's record for the league, it is the highest score fired in the present league season, and her 50 offhand is the first offhand possbile for the present season.

Firing for Cos Cob in the next relay after Mrs. Ventres in this same match, Sam Burkhalter fired a 197 score, with another 50 possible offhand. (Editor's comment: Sam has been playing a rather consistent second-fiddle role in this season's gallery rifle shooting, but he sure has kept folks aware that he was "a shooter to beat" if they hoped to win.)

Beating Cos Cob clinched the league championship for Rippowam, they being undefeated in the 14 match schedule. Cos Cob was the runner-up with a 12 won and two lost record.

MAINE GALLERY PISTOL

Two "dark horses" elbowed the favorites aside and took first and second aggregate places at the Maine State Gallery Pistol Championships, fired on the Hampden Club range, March 19th.

Dr. Elmer R. Pelletier of Fort Kent fired a score of 841 X 900 to win the open championship. He won the rapid fire match, and was second in both the slow fire match and the "Camp Perry" course (not included in the aggregate).

William P. Andrews of Houlton fired an 836 score to take runner-up spot, winning the slow fire match and taking first spot in Sharpshooter class in the timed fire and gallery course matches while building his aggregate score.

This is said to be the first time that residents of Maine's northernmost Aroostook County have so completely wiped-the-eye of the "Southerners" in State pistol championship competition.

State Trooper, and former state champion, John Pinkham of Litchfield, was third in the aggregate with 834, and won the Timed Fire match.

The Blue Hill Club team won the team match in a field of 8, with Sargent, Ricker, Clark and Maddocks totaling 1095. Fort Kent was second with 1089 and Loring AFB third with 1084.

MODESTO, CALIFORNIA

Fifty-six competitors fired in the Modesto Rifle Club's third annual gallery rifle championship tournament, March 25th and 26th. Shooting was from 5 to 10 P. M. Saturday and continued from 8 A. M. to 5 P. M. Sunday.

Robert Wood of Ukiah was the tournament aggregate winner with a 788 score. Irwin Brown from Ukiah was second with 786, while Kenneth Cummins of Sebastopol and Victor Zimin of Santa Rosa placed third and fourth, each with a 785 score.

In the prone match, Major Harold Bourgoin started out with a 200-20x, tieing John Silveira of Ripon and Vic Zimin. In the shoot-off, Vic dropped his 4th X and John Silveira dropped his 11th. Bourgoin went on to shoot 78 additional X's, trying to set a new record—but better luck next time.

Modesto's 12 point indoor range can handle more shooters but the social room has been a little small and is now being enlarged to accommodate more people.

The annual smallbore rifle, long range, **Palma Match** for eight man teams with five high to count for team score will be fired on the Modesto outdoor range on May 21st. Entry is limited to 12 teams. (Editors' note: This is the only place in the country, that we know of, where the old Palma Match course—100, 150 and 200 yards—is presently being fired.)

1961 MILWAUKEE SENTINEL SPORTS SHOW JUNIOR RIFLE RESULTS

March 18-26, 1961

For the seventh year in a row, the Milwaukee Sentinel Junior Rifle Championships showed an increase in entries. This year's 238 postal qualification entries passed the 1960 entry of 151 by a large margin. Seventh teams fired at the Sports Show in three classes. A new military class, made up of military academies and high school ROTC units, was formed. Class "A" of 15 years and older juniors and Class "B" of under 15 remained the same.

The Class "A" first place was won by Notre Dame High School of Niles, Illinois and the school's second team took second place with scores of 719 and 716. High individual in Class "A" was James Rezach of the Manitowoc Recreation Department of Manitowoc, Wisconsin, with a 188. Two 187's by K. Thieding of Reedsburg and Paul Capicik of Fond du Lac were second and third respectively.

Jim Meitner's Class "B" team of The Waterloo VFW, Waterloo, Wisconsin, again took top honors. The four man team firing twenty shots prone each, got a hot 772 aggregate. Meitner and his assistant coaches, Augie and Pat Hofenstein, have fired teams in six of the seven years this event has been held, placing first five times and second once.

Syd Herman of Cottage School, Brookfield, Wisconsin, had the second place team with a close 770. Third place went to Waukegan, Illinois, International Shooting Association Juniors with 769. Individual honors went to Ted Couch and Karen Ellison with 200-17X and 200-15X respectively.

Class "A" Military was won by a team from Waukegan International Shooting Association Junior Club with a 725. Coached by Marine Captain, "Dutch" Couch, two of the team members were high individual winners. Richard Lakey and Ted Morrison fired ten shots prone, and ten shots offhand, scores of 190 and 189 respectively.

In the Wisconsin Senior College ROTC matches, St. Uorbert of DePere, was first with 1893 and the University of Wisconsin, Milwaukee, second with 1874. Carl Guenther of St. Norbert fired the four position match getting a 99 prone, 97 sitting, 96 kneeling, and 97 offhand for a 389 and high individual honors. After the matches, Carl's teammates got into their cars and left for DePere, forgetting Carl at the range. Firing a 97 offhand and a 389 aggregate, he was presented with a 120 mile bus ride for a reward.

Chet Snavely

MIRAGE

Robert Sears

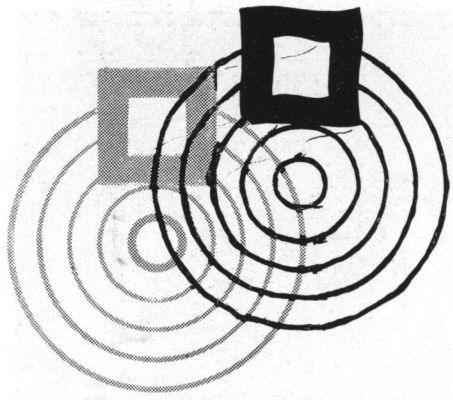
Principles

In order to know what mirage is, it is necessary to understand something of the refraction of light. To begin with, we are accustomed to thinking of the path of a light ray as a straight line, which is rarely true. The course of a ray of light is deviated by any transparent medium, even air, through which it passes. Each transparent substance has a greater or lesser ability to change the path of the ray. This is numerically expressed as its index of refraction. Flint glass has an index of refraction of about 1.579880, Crown glass about 1.516149, watre 1.3324, and air only about 1.000292. The word "about" is not used in an attempt to hedge, but is made necessary by the fact that this figure varies with the temperature of the substance. In glass, temperature difference can actually make the focal length of our scopes slightly shorter in cold weather. The difference in indices of refraction of different kinds of glass is utilized in the optical design of telescopes to correct for normal aberrations. Compound lenses, made up of different types of glass, make it possible for the aberrations of one element to compensate for those of the other.

The refractive power of water, while not actually concerned with mirage, is useful for illustration purposes. An oar in the stiil water of a mill pond appears deflected in a straight line. If there is a steady current, one kind of distortion is apparent, and if the water is turbulent, as when it flows over a rocky bottom, another kind is added. This is equally true of motion or turbulence if the medium is air. On top of this, the amount of refraction in air is affected by the humidity of the atmosphere. While the refractive power of air is small, it begins to look as if its positive value is the hardest to pin down of any. Mirage is an illusory effect caused by the refraction of light as it passes through air.

As if things were not already complicated enough, let's toss in one more variable. The angle at which a light ray passes through the air affects the amount that the ray is refracted. If a ray enters the atmosphere vertically, as a star at its zenith, no refraction takes place. This is the only time that light travels through the atmosphere in a straight line. As the angle grows larger, the amount of refraction becomes greater at an aver-increasing rate, until it reaches its maximum at the horizontal. The normal path of a ray through the atmoshepere is bent downward, toward the earth. To visualize the amount, consider this fact: When the sun sets and its lower edge appears to touch the horizon, **the entire sun is actually below the line of sight, under the horizon.** The rate of increase may, at times, be observed in that the lower part of the sun is refracted enough more than the upper part so that the sun looks slightly egg-shaped.

References have been made in recent issues of this magazine to claims of telescopes eliminating mirage. While I have never seen it claimed in print that any scope would eliminate mirage, a very well-known manufacturer of optical instruments used to use full-page ads which claimed that their scope would control mirage, which is equally silly. The most misleading thing about this advertisement was that while the words, CONTROL MIRAGE, were blared across the top of the page in very large letters, the same words appeared in the fine print text under a photo of the scope in quotation marks. This sort of thing may have helped sell scopes, but it didn't help



riflemen to understand the truth about the mirage problem.

Practical Effects

As the Beginners' Corner has pointed out, it may be better to first know about the practical effects of a natural phenomenon before delving too deeply into the theory behind it. Understanding the theory, more often than not, is the result of natural curiosity after knowing to your own satisfaction what the perceptible effects are.

At the outset, mirage, like the wind, is something that none of us are going to eliminate or control, so we might better see what we can do about compensating for it. There are many close analogies of the effects of wind and mirage, but these primary facts must always be kept in mind:

1. **Wind physically moves the bullet**
2. **Mirage optically moves the target**

If the wind were from exactly the same direction and at a constant speed during a course of fire, the group size would be unaffected. This is also true of mirage. The problem to the rifleman is not that wind and mirage exist but in their variations in amount and direction. Wind and mirage act in conjunction to change the point of impact of a bullet. A wind which moves a bullet to the left also moves the target image to the left by moving the medium (air) through which the light rays travel. Given the exterior ballistics of the bullet and the speed and direction of the wind, the amount of wind drift can be calculated with a great deal of certainty. We are surprised at how much this can be, and sometimes even more surprised to find that in actual practice the displacement seems to be much greater than the figures indicate. The difference is the amount caused by mirage. In other words, the bullet's point of impact on the target is changed partly because the wind carries the bullet and partly because you aim it out there.

It is normal for colder layers of air to arrange themselves closer to the ground. Colder air which is comparatively denser causes light rays to be bent downward. However, the opposite effect can take place when the warmer air is near the ground, as when the sun shines on a sandy range. The ability of sand to warm the air above it accounts for the completely detached images often seen in the desert. At any given moment, a target image may be displaced upward at one point between the rifle and the target and downward at another. Similarly, the wind can move both the bullet and the target image to the left at one point and to the right at another. The end result at any one moment is the sum total of these factors. It has always seemed to me that while the total amount is greater in a horizontal direction because the wind and mirage act in conjunction, the vertical variations are the hardest to outguess. Extensive experience plus a natural facility for such things makes some riflemen effective wind and mirage "dopers." By watching the direction and speed of flow, they "hold into it" by guesstimation, and thereby turn in some very creditable scores. For me, the average results have been better by trying to let off each shot when conditions are as nearly alike as possible. After watching the aiming point shift around for a few seconds, it can be sensed where its normal or real position is. I try to stick with this.

Under most conditions, the flow of mirage should be noted not only for its own importance but also because it provides the best means of gauging the wind. This is the only method that lets us judge the sum total of both at the instant we let off each shot.

One last analogy between wind and mirage. We will never learn to shoot well under windy conditions by always choosing a calm day to do our practice shooting. neither will we learn to judge mirage by passing up practice while the wiggle waves are against us. The wonderfully small groups we make under ideal conditions are valuable as indications of inherent accuracy of the rifle and load, but it also takes close control over the human factors to win under match conditions. This is another way of stating my conviction that the number one problem of the bench rest shooter today is not rifles or ammunition but sighting error.

MORE ABOUT BULLETS

Dear Phil:

Precision Shooting has the same effect on me as a company of good fellows sitting around a table and enjoying conversation. Somebody makes a statement that reminds the other of an experience he has had and the hours fly by while each recounts his reaction or ideas concerning the subject at hand.

I have just read your very excellent article on Hollow-Point Bullets in the February issue of Precision Shooting. I agree wholeheartedly but I would add one more element to the general idea set forth. Hollow point bullets are more accurate in both theory and fact than soft-point or hard-point. They are more accurate than hard-point bullets not only because the point carries less weight but also because the **base is protected.** When a jacket is filled from the front instead of from the rear, you can get both a protected base and a hollow point.

Some years ago I wrote an article for Precision Shooting complete with photographs in which I pointed out some of the reasons why military open base bullets such as our M1 and M2 bullets lacked the accuracy of which they were capable. Although some of our older subscribers may recall that article and photographs, I shall include a short summary of it in the following remarks.

During World War II, I worked with Army Ordnance in ballistics and one of our problems concerned the accuracy of the M2-152 grain ball bullet when made with "Bi-Metal" jackets. "Bi-Metal" consisted of a soft steel sheet coated on each side with a layer of copper alloy. The early laminated sheets were rather thick in cross section and were the result of a bonding process and not plating.

We found that work-hardening during the forming process tended to increase the spring-back of the jacket from the core. The spring-back was sufficient to permit the early twisting motion imparted by the rifing to create slippage between the jacket and the core. The fact was verified by a very simple experiment. Two small holes

were drilled into opposite sides of the bullet just deep enough to penetrate the jacket and mark the lead core. If I remember rightly, they were drilled rather close to the cannelure on the side toward the point. The bullets were then fired into and recovered from a sawdust tube. On nearly all the bullets the jacket had slipped or turned a distance at least equal to the width of the holes. Later development of more effective annealing procedures almost but never completely eliminated the problem. This slippage still occurs in some of the ammuniton issued by Uncle Sam.

We also found that the exposed lead base of the military bullet affected accuracy to a considerable extent. This was verified by simply cutting off a Springfield barrel so close to the receiver ring that the bullet of the chambered cartridge protruded from the muzzle. When the bullet was recovered from the cotton waste into which it was fired, it was found that the lead base bore imprints of powder grains that early rear ignition had forced into it. The effect made the base very ragged and uneven. A bullet that was perfect and uniform when it entered the barrel was no longer perfect and uniform when it emerged from the muzzle. Recovered bullets fired through a full length barrel have a smooth concave appearance but that is because the heat and pressure of the gasses eventually make it so during its passage through the barrel. Unfortunately, the base of no two bullets are the same when they emerge.

A properly constructed base such as you have on a soft or hollow point bullet tends to resist deformation by the gasses and because of that resistance are more accurate. A resistant base plus the light hollow point makes an unbeatable combination.

The British at one time discovered the efficiency of a light point bullet and overcame the objections of the Geneva Convention to hollow points for military purposes by filling the point of their .303 cartridge with a cone of aluminum. The result was not only a lighter bullet that improved logistic problems but it also improved accuracy. My own experiments with incendiary bullets built upon the same principle also proved superior in accuracy when compared with standard ball bullets. This difference in accuracy showed up not as the result of comparing a few dozen rounds but in the results obtained from firing hundreds of thousands of rounds.

While attending exhibits at National Rifle Association conventions, I have tried on a number of occasions to sell companies such as Sierra on the desirability of making .30 caliber 180 grain and 200 grain match bullets on the hollow point principle but, as yet, to no avail. Nevertheless, I do believe they will eventually come to it and I am holding down my stocks of shooting fodder until they do. Sierra now makes an accurate .30 caliber match bullet but there is no reason why it should not be further improved by adopting the hollow point principle. Ordnance can do much work along this line and I wish I could again help them do it.

Yours,

Fred W. Hallberg

POSTSCRIPT TO "MORE ABOUT BULLETS"

Dear Phil:

A few days ago some of my friends dropped in for an evening of conversation. To nobody's surprise the general theme was shooting. The subject of hollow point bullets was brought up and I showed them my letter concerning that subject addressed to you. The letter raised so many questions that a long postscript seems to be in order. Here are the questions put to me by a couple keen observers.

Question: If a jacket filled with soft lead has holes drilled into it, will it not be possible for the lead to extrude into the holes under the early impact of the gasses?

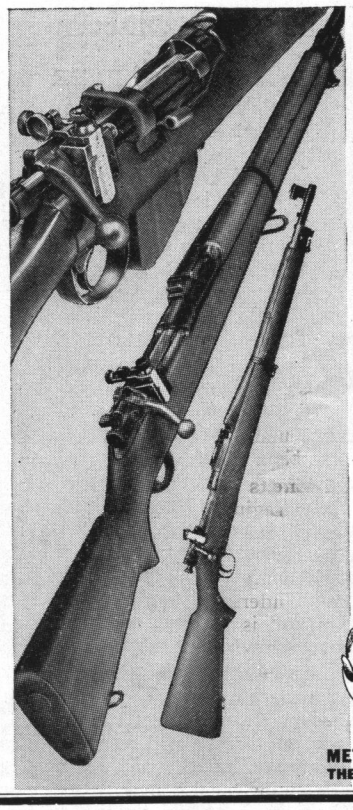
Answer: Yes, soft lead will move into the holes drilled into the jacket. However, I had reference to the hard lead core that was specified for the early .30 caliber ball bullet. This question of extrusion is also a possibility that manufacturers of hollow point bullets must consider. If the jacket is not sufficiently strong or if the bullet is not properly designed, it is possible for the lead core of a hollow point bullet to move forward. Such change in position or shape of the core will destroy uniformity and prevent accuracy. A boattail bullet will upset to a lesser degree than a flat base bullet and, therefore, a boattail should always be the most accurate when used with an open point. (Editor's comment: There may be some eyebrows lifted regarding this answer, especially the last sentence.)

Question: Was the British .303 aluminum pointed (core only) bullet especially designed for accuracy?

Answer: No. Accuracy was simply a by-product or dividend of the design. I understand some poor lots were manufactured but those that were good were really good. The idea of aluminum in the tip of the jacket was not original with the British. Some of the Mediterranean and Balkan countries had previously used similar tips. The real purpose, and again I am leaning heavily on hearsay, was to obtain the increase in velocity that a lighter bullet would produce without shortening the overall length of the cartridge or changing the seating depth of the bullet.

The Japs had a still better idea. They obtained the same effect by simply thickening the jacket material in the bullet point. Steel is considerably lighter than lead and wherever lead is displaced by steel the bullet will become lighter by that amount. Before the .30 caliber armour piercing bullet became standard for use on the battlefield, I suggested to Ordnance that the jacket material in the point of our steel bullets be thickened but the idea was rightly rejected. The thick jacket at the point produced a superior ball bullet for ordinary use but the AP as we know it today is superior for all around wartime purposes.

(Continued on Page Eighteen)



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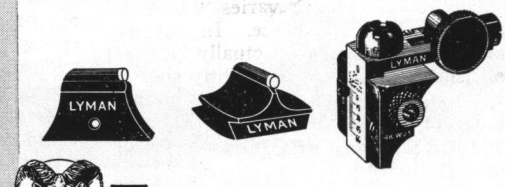

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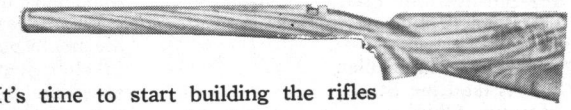

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Individual annual dues $5.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) $2.50. Life membership, $75.00. Annual club affiliation fee $10.00.

A NEW BENCHREST "INCENTIVE" AWARD

Following up his own interest in developing better accuracy from the larger caliber rifles, especailly in .30 caliber, and believing that some worthwhile incentive may encourage others to do more experimental work along this line, Brunon Boroszewski of Buffalo, New York, hereby announces that he will donate a one hundred dollar ($100) cash prize award to the person who fires the smallest National Match Course aggregate with a .30 caliber rifle in a National Bench Rest Shooters Association registered match during the 1961 calendar year.

Details of the judging for this award have not yet been announced but will be published in this magazine when known. The competition is open for unrestricted bench rest rifles and the National Match Course aggregate is the minute-of-angle aggregate for five 10-shot matches at 100 yards and five 10-shot matches at 200 yards.

While waiting for further details, anyone who may fire this National Match Course with a .30 caliber rifle in a registered match would do well to save his match targets, a copy of the results bulletin for the match, and secure a copy of his registration and equipment data card, certified by a match official.

Brunon Boroszewski, of course, eliminates himself from this competition.

THE PRESIDENT'S CORNER

The article by Col. Townsend Whelen in January issue of Precision Shooting was very interesting. I wish to thank Col. Whelen for the credit he gave to the N. B. R. S. A. It is always nice to receive recognition for the things our organization has contributed and more so when it is the prime objective of the organization. His suggestion that we start a class for further development of the free rifle is worth considering. Like all proposals there are reasons for and possibly some against it. We should study this proposal and decision will depend on the number of members who would be interested in shooting a free rifle.

I have received several proposals on our prbolem of rapid firing and a bad backer resulting from it. Considerable thought and work has been done by some of the members. These suggestions appear to have advantages and some disadvantages which can only be checked by actual trial. All will receive proper consideration and trials if possible.

We are now at the time when our shooting program for the year begins. A season when we will meet old friends and make new ones. We will return to a range where we may have won an aggregate, made a friend, helped a new member or received help from an old timer, but for the most part it is a renewal of pleasant memories. Please remember that these returns are made possible because a certain number of club members are willing to work hard, accepting a lot of responsibilities and worries, that we can meet and compete in our bench rest sport. For all this I ask our shooting members to extend their thanks and appreciation to the clubs and their active representatives. Honest appreciation does much to sooht some of the rougher situations that are bound to crop up now and then.

I wish to end this column with this thought: The three most important things about our matches are; the pleasure and privilege of honest competition with each other, the friendships made, and the memories to take home.

Until May,

Bob Hart

AVAILABLE FROM NBRSA SECRETARY

New 1961 rule books are available at 25¢ per copy.

NBRSA official match targets (required for registered matches) are available from the secretary's office. Match sponsoring clubs are advised to anticipate their target needs for the season and to order their supplies well in advance of match needs (30 day minimum and longer is desirable) in order that they may be assured of having the targets on hand when needed.

Address all orders and inquiries to: **NATIONAL BENCH REST SHOOTERS ASSOCIATION, INC., 603 West Line Street, Minerva, Ohio.**

1961 BENCH REST MATCHES

NORTHWEST REGION

Benton, Washington: June 17-18, Aug. 12-13 (registered, unrestricted and Varmint classes); May 14, June 4, July 16 (not registered, Varmint and Sporter classes); Seattle Precision Shooters Club, Roy E. Meister, 3937 Ashworth, Seattle 3, Wash.

Lewiston, Idaho: July 2-3 (Varmint class in day time and unrestricted class nights) Raymond G. Speer, Box 244, Lewiston, Idaho.

GULF COAST REGION

San Angelo, Texas: May 27 and 28; Texas State Bench Rest Championship (unrestricted bench rest rifles); (Mrs.) Marie Spencer, Box 1243, San Angelo, Texas.

San Angelo, Texas: August 12 and 13; Texas State Varmint and Sporter Rifle Bench Rest Championships; (Mrs.) Marie Spencer, Box 1243, San Angelo, Texas.

MID-CONTINENT REGION

Wichita, Kansas: April 8, May 13, July 1-2, and Sept. 30; Wichita Bench Rest Rifle Club, Larry Engelbrecht, Sec'y, 122 Gow, Wichita 3, Kansas.

Kansas City, Kansas: June 3, Aug. 5, and Oct. 21; Mill Creek Rifle Club, Inc., L. F. Carden, Sec'y, 2211 North 44th St., Kansas City 4, Kansas.

Tulsa, Oklahoma: Apr. 16, May 21, June 17, July 15, Aug. 19, Sept. 16, and Oct. 8; Tulsa Bench Rest Rifle Club, Inc., E. A. Anderson, Sec'y, 3604 So. Toledo, Tulsa, Oklahoma.

AD TO 1961 Bench Rest Matches

EASTERN REGION

(Unrestricted Rifles)

Augusta, Ohio: April 15-16, May 27-28, June 17, Aug. 19, Sept. 16-17; Reed's Run Rifle Range, P. O. Box 66, Augusta, Ohio.

Plainfield, New Hampshire: May 21, July 15-16, Sept. 17; Plainfield Rifle Club, Leslie R. Stone, Plainfield, N. H.

Easton, Ohio: June 10-11, July 29-30 (Ohio State Championship); Chippewa Rifle Club, Nelson Berger, Sec'y, R. D. 1, Box 192, Marshallville, Ohio.

Southboro, Mass.: June 25, Aug. 13, Oct. 15; Southboro Rod & Gun Club, J. W. Baldwin, P. O. Box 402, Westboro, Mass.

Lewistown, Pa.: July 1-2 (Eastern Region Championship); East End Blue Rock & Sportsmen's Club, P. J. Aurand, Milroy, Pa.

Dryden, New York: Aug. 26-27 N. Y. (State Championship); Dryden Fish & Game Club, Russ Cuatt, Sec'y, 113 Park St., Ithaca, N. Y.

Johnstown, New York: Aug. 31 and Sept. 1-2-3 (National Championship); Pine Tree Rifle Club, Inc., Johnstown, N. Y.

(Sporter and Varmint Rifles)

Augusta, Ohio: May 6-7, July 21-22-23 (National Championships); Reed's Run Rifle Range, P. O. Box 66, Augusta, Ohio.

Dryden, New York: May 14, June 4 (N. Y. State Championship), Aug. 5-6 (Eastern Region Championship); Dryden Fish & Game Club, Russ Cuatt, Sec'y, 113 Park St., Ithaca, N. Y.

Fassett, Penna.: June 18, July 9, Aug. 20, (Penna. State Championship), Sept. 24; South Creek Rod & Gun Club, Gerald Arnold, Sec'y, 111 N. Halett Ave., Horseheads, New York.

Easton, Ohio: June 10-11, July 29-30 (Ohio State Championship); Chippewa Rifle Club, Nelson Berger, Sec'y, R. D. 1, Box 192, Marshallville, Ohio.

NORTH CENTRAL REGION

Custer, South Dakota: May 21 (Sporter & Varminter), June 17-18((Sporter & Unrestricted), Aug. 12-13 (Varmint & Unrestricted); contact Walt Siewert, Custer, South Dakota.

Buffalo, Wyoming: Apr. 16 (Rimfire Match), May 7 (Crow Shoot), July 15-16 (Unrestricted and Heavy Varmint), Sept. 10 (Sporter), Buffalo Outdoor Rifle Club, Martin Pelloux, Sec'y, Clearmont Rt., Buffalo, Wyo.

Iowa Falls, Iowa: Unrestricted rifles, night shoots—May 6, June 10, July 8; Sporter and Varmint Rifle—May 7, June 24, July 9, Sept. 10; Iowa Falls Rifle, Pistol and Trapshooting Club, Inc., Verle W. Hunt, Sec'y, Ackley, Iowa.

MISSISSIPPI VALLEY REGION

Florissant, Missouri: June 25 (Heavy Varmint class). Aug. 20 (Unrestricted class); Nine Ring Sportsman's Club, Roger French, Sec'y, #15 Charlotte, Florissant, Mo.

St. Louis, Missouri: Unrestricted rifles—June 4, July 9 (Mo. State Champ.), Aug. 27 (Regional Champ.). Light Varmint class—Apr. 30, May 28. Heavy Varmint class—May 14, June 18, July 16. Sporter class—May 7, June 11, July 16. Aug. 13: Bench Rest Rifle Club of St. Louis, Arthur M. Freund, Sec'y, 2730 St. Vincent Ave., St. Louis 4, Missouri.

Windsor, Illinois: June 10, July 15, Aug. 12, Sept. 9 (Ill. State Champ); all matches are for unrestricted rifles and all are night shoots; Windsor Rod & Gun Club, Inc., Robert E. Adams, Sec'y, Windsor, Ill.

SOUTHWEST REGION

Richmond, California: Apr. 29-30, July 8-9 (Calif. State Champ.); Richmond Rod & Gun Club; programs from John B. Sweany, 187A Silverado Trail, Calistoga, Calif.

Fresno, California: Regional Championship in Aug. or Sept.—dates not yet set; Contact—Henry C. Wright, Fresno Rifle Club, 4663 East Olive, Fresno 2, Calif.

Yreka, California: Spring and Fall Shoots (definite dates not yet received); Yreka Rifle Club, Ernest Brazil, Sec'y, 404 Herzog Blvd., Yreka, Calif.

SOUTHWEST REGION
Yreka, California: May 28-29 (Unrestricted and Varmint classes); Yreka Rifle Club, Ernest Brazil, Sec'y, 404 Herzog Blvd., Yreka, California.

BENCH REST MATCHES

The Arizona Bench Rest Association February shoot was held on the South Mountain Range at Phoenix on the 19th, with nine shooters competnig. All matches were shot at 100 yards.

Jack Williams' .630 was the best aggregate for four matches with the 10 lb. rifles and Frank Minucci's .670 was second. Minucci won the five 5-shot match aggregate with 13 lb. rifles with a .418 and Williams was second with .510. Lawrence Brenner won the four 10-shot match aggregate with unrestricted bench rifles with a .522 and Ruth McMillan was second with .525, Minucci third with .613 and Williams fourth with .615.

In the re-entry match, Brenner was first with a .230 group, Leslie Kierin second with .240 and Williams third with .250.

POSTAL MATCH

Southwest NBRSA Director John B. Sweany has provided a postal bench rest match program to keep the shooters active during the winter, and to permit new shooters to "get their feet wet" in competition.

The first mtach, fired in January, had 8 California shooters firing the unrestricted rifle class. O. E. Blanchard, Ed Suchan and Jack Bridwell taking the top three spots.

Seventeen shooters from California, Alaska and Wyoming were listed in the bulletin for Heavy Varmint class. Five shooters from New Jersey also fired in this class but their report did not reach Sweany in time to be included in the match bulletin. Bruce Pheasant, Wyo. was top in this class, followed by George Hendricks, Calif., Irwin Rowe, Calif., and C. C. Hankins, Wyo. Joe Stearns, N. J., fired an aggregate that would have been in the top four places.

Five shot in the Light Varmint class, three of them new in B. R. competition. All were from Calif. Jack Bridwell, Gazelle, was winner, followed by John O. Hull, Tule Lake, and D. D. Jenner, Modesto.

NEW YORK

In January of 1961 three area clubs, the Dryden Fish & Game Club, the Chemung County Rod & Gun Club, and the South Creek Rod & Gun Club (Pa.), got together and formed a Winter League. All shooting is done with Heavy Varmint class bench rest rifles. Shoots are held every other Sunday at the Chemung County Rod & Gun Club. The program at each shoot is five 5-shot matches at 100 yards. These shoots have been drawing from 10 to 15 shooters, but more are expected as the weather improves.

Shooting is done from the back porch of the range house (see cover photo). Ain't nothing fancy, but we sure have a lot of fun. Even on very cold days, shooting is comfortable, as the shooters can stay in the range house until it is time to shoot, and after shooting run back into the range house to get warmed up by the glowing pot-belly stove. More shooting is done around the stove than is done outside, but it is a different kind of shooting.

Shooting conditions during the Winter months varies from bad to worse. The wind usually blows like a Banshee, and the mirage is very hard to pick up in the scope. Anyone who can get an aggregate under .500, shooting in these conditions, has to be really "on the ball." Ed Shilen

L. F. "Bud" Carden, Kansas City, Kansas, the new National Match Course aggregate record holder, with his record breaking rifle. Note the custom made action by Baucher of Kansas City.

A NEW AGGREGATE RECORD RECOGNIZED

A National Match Course aggregate with unrestricted bench rest rifle shot at Wichita, Kansas, on October 1, 1960 by L. F. "Bud" Carden of Kansas City, Kansas, has been officially judged as .3577 minute-of-angle and declared a new record.

The former record of .3729 M. O. A. was shot by Henry Barton of Wichita, Kansas, at Wichita on September 28, 1957.

Carden's 100 yard aggregate was .3304 and his 200 yard aggregate was .3850. The rifle Carden used to make the new record had a Hart barrel on a Baucher action and was chambered for the .222 cartridge. The rifle was made by the Kansas City gunsmith, Howard G. Baucher. His scope was a Lyman 20X. His load was 25 grains of Ball powder, Remington primers, and 50 grain bullets made in B&A dies.

MORE ABOUT CARDEN'S RIFLE

Dear Phil:

. . . . . This rifle was first built in Aug. '57 on Weber action, Douglas barrel in .222 caliber and line-reamed case, but never could make it shoot so after 1645 rounds, H. G. Baucher, my gunsmith and shooting buddy, ground the action and fitted it with one of his sleeves, which is a 2x2x12 bar of steel, bored to fit action and split part way on one side. It is then locked on action with 4 cap screws. This allows for quick removal for rebarreling or replacing with another action and barrel, thus one may have several rifles but only the cost of one sleeve and stock.

It is much easier and better fitting a barrel to action alone than working down a 6 inch deep hole. I have always had more bedding trouble with any action that has the front guard screw in the recoil lug, such as Weber, Enfield or Mauser. This forward screw tends to pull down on front of action. I like bedding that will enable me to loosen any action screw and show no movement on a dial indicator placed on barrel at end of stock.

On July 10, 1960, a new Hart #3D barrel was fitted and it took off like a bomb. With only 90 rounds of checking, I took it to Tulsa July 17th and fired a .3447 grand aggregate but lost a possible record because of backer trouble. At the time of firing the match at Wichita, Oct. 1, 1960, this barrel had a total of 1048 rounds.

The case is still a .222, with necks outside turned to .010 wall thickness and the chamber neck is .246 instead of the standard .252. My load was 23 grains of Hodgdon's Ball C (charges thrown from B&M measure), Remington cases and primers, and my own 50 grain bullets made in B&A dies.

To prove the stability of this action sleeve, H. G. Baucher was shooting his own rig, which is identical to mine in caliber, sleeve, load, bullets, trigger and rests, but with Enfield action and Douglas barrel. He was shooting next to me at Wichita last October 1st and he also shot a record breaking grand aggregate of .361 to take second place in the match.

"Bud" Carden

BEGINNERS CORNER

By Robert Stinehour

The piece of wood that is a real pleasure to work into a stock is very rare. Most of them have at least a part that is hard to work. A bad cross-grain or knotty sections, if they have much figure. Some are stringy and splintery in grain, and even with sharp tools, there does not seem to be a right direction to work. Some are soft, and some are punky, or have sections of one or the other. On these, when working the outside shape, the rasps and then the file will bruise the wood far below their cutting depth. This makes extra work in sanding to remove these bruises, and sometimes double work, for to keep the stock concentric, the same amount of wood must be removed from the opposite side. It can mean winding up with a finished job not as well shaped as you had planned.

The last three stocks I have done had all the bad features afore-mentioned. This did not make them bad or impractical stocks, just hard to work, if not "doctored."

A sure cure for all these ills is; two parts turpentine to one part Val oil. Depending on the ill determines how much and how often one needs to use it. It should be soaked on generously with a brush and then allowed 24 hours until the next application. On an open grained, porous, or

(Continued on Page Twelve)

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USE SPINTRU — 7-S BULLETS
Double processed and individually weighed.
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Beginners Corner

(Continued from Page Eleven)

punky stock it will penetrate pretty deep. Much of the Missouri walnut is open grained and works much better after applying the varnish and turpentine.

One of the three stocks I mentioned was a French walnut blank, perfect on the quarter saw, and a very pretty grain. This is the first French blank I have ever had which was soft, almost punky, and too nice a stick to lose. When I got it rough shaped, I applied three coats of Val. and turp., after which I started the inletting. It cut like nice cheese and I found the medicine had soaked in at least ½ inch. Here the complete stock was treated again and laid up. The next day this one was taken down and nearly finished inletting, also shaped to near finish. It worked beautiful inside and out. Another soaking and two days later finished in and out and sanded. It finished into a fine stock that I'm sure would never move.

The second stock of the three was an American walnut, ordered with crotch figure in the butt running to straight grain in the fore-end. This blank was also very well sawed and loaded with beautiful figure (and no checks), but the figure ran ahead half way into the action. This made much cross-grain of very hard wood and I found it was nearly impossible to make two passes with the chisel in the same direction. This makes for much exercise and at times it would help if one were a contortionist. I can stand on my head OK but I find it hard to use chisels while doing so. Time for the medicine. This piece of wood was so hard and dense that the penetration was not nearly so deep as on the French blank, but the Val. and turp. sure made it 100% easier to work. So we inlet and soak 24 hours and repeat until the job is finished. It takes much longer to do an individual stock, but the actual work time is much less than fighting it out with a hard working stick, **and** one winds up with a much better job.

Number 3 was an all mahogany laminated blank which was soft, open-grained, and stringy. This type does not need much medicine to work well, but needs plenty after inletting and shaping; especially inside to help harden the stringy fibers and prevent the wood compressing so much between action and guard. One doesn't have to worry about bedding change in such a blank, for it will maintain itself under compression. This is actually a good feature, **IF** the stock is not so soft that the compression will necessitate continual shortening of magazine to avoid contact with the action, and shortening trigger to avoid hitting the guard bow. If it is too soft one might eventually run out of trigger to cut off, and pulling the trigger is the most fun of shooting.

IN DEFENSE OF SELF

Like a good baseball umpire, I **try** to call 'em the way I see 'em, and maybe like the umpire, I sometimes don't see them the same way as the fans in the bleachers do. Nevertheless, no one has thrown a pop bottle at me until Mr. Dale Rowe, in Feb. P. S., and I feel it necessary to defend myself.

Like umpires (and the rest of us), teachers can be wrong, too. I recall many, many times during my son's education prior to his entering the Navy, when he would mention something a teacher had stated as fact, that wasn't so at all, and many times the boy knew himself from his own travels and experience that it wasn't.

Mr. Rowe must be of the old school of teachers, for his argument contradicts the trend of modern educational systems. More and more there are short cuts to learning. With most of our schools overloaded and a shortage of qualified teachers, these methods are necessary, and who will argue that our kids are not as advanced as we were at their age? So, what's wrong with short cuts to learning?

Granted, there are probably a few exceptions where short cut methods would be detrimental to the learner, but I insist that my explanation of doping mirage and wind (which Mr. Rowe disagreed with) would not harm the rawest novice. In fact I have had many compliments from both little experienced, and well experienced, that it was very helpful.

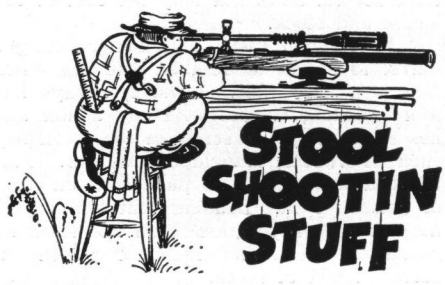
There are perhaps many places where I have been and will be justifiably liable to criticism, but I feel that this criticism was ill placed. I am for constructive criticism, but could see nothing constructive in Mr. Rowe's complaint.

DON'T KILL A GOOD PROGRAM

It appears that the NBRSA Varmint class competitive program is going to grow by leaps and bounds if nothing happens to hurt it. I believe that one of the things that would hurt it most would be for some fellows to **stretch** the rules and come up with "baby bench rifles." I know that some are building such rifles for I am supplying the stock blanks. If a fellow comes to a match with an over-the-counter rifle he is going to hesitate to shoot against these baby monsters.

For the Varmint class to **grow,** we must, in my opinion, stick to a sensible, conventional rifle design that a fellow might carry in the field. Many of us know that these monsters will not have a great advantage, but still many others will feel that they do, and it will cause dissension.

Let's attend these matches more for the pleasure of shooting than just with the idea of winning. Sure, we all like to win, and we can't honestly compete without trying to, but winning should not be uppermost.



Dear Phil:

Easter will soon be here and it is long past the time when I should be getting my column off to you but I have been in the midst of some very interesting developments and thought I would wait a few days beyond the deadline in order to keep my column news as current as possible. In the midst of the summer shooting season, news gets around so fast by word of mouth from shooter to shooter that no printed publication, no matter how rapid its system is, could distribute news half as fast as does the bench rest shooting clan. During the winter months, we must depned upon correspondence from shooter to shooter to a great extent; however, the bull sessions following and in between the business sessions such as we have at Elmira are packed full of discussions pertaining to new ideas and products.

I had not heard of the new publication by the International Shooting Union until I picked it up in the March issue of Precision Shooting. I can see where such a magazine might be of great interest to us in the bench rest game. We certainly take our shooting very seriously and there may be lots of good ideas coming from foreign lands as well as our own citizens who are also taking a slightly different type of shooting vrey seriously. After all, their objective is also the "ultimate in accuracy" and to achieve it, they must stick pretty close to the same fundamentals which consist of eliminating, wherever they may exist, errors and never ceasing to exploit uniformity to the fullest possible extent.

Those persons who know their subject best have always had to stick pretty close to it through day and night. If this is true, and I have no doubt but what it is, I don't know why I shouldn't be further advanced than I am. I certainly think about accuracy enough through the daytime to have become a real expert on it but although I am sometimes complimented, I don't feel that I am half as far along as I should be. It always seems to me that there must be some break-through which will get us to a higher accuracy level.

Such a break-through, although I had nothing to do with it, arrived a few days ago and was more welcome than a Spring tonic, and after all, following a winter such as we had, a tonic is just what is needed. Mine came in the form of a telephone call from the local express office saying that there was a package on hand for me. I didn't recall anything in my files that indicated something was due and couldn't imagine what to expect.

Such things went through my mind, because it has happened before, that some friend of mine, enjoying warmth and luxury in Florida, had taken pity on a poor old shooter who was plagued by a winter with more wind and snow than he had ever seen before on Cape Cod (just for the benefit of the Chamber of Commerce in our area, I had better add that the winter was still better here than in many other areas of the East) and had sent me a crate of oranges. My luck was better. It was a sample lot of the new #250 Magnum primers just coming in to the market by Cascade Cartridge Inc. of Lewiston, Idaho. We saw CCI primers winning a lot of matches last year but Mr. Dick Speer sure re-ignited a subject that has been close to my heart for a long time.

I have done a lot of experimenting with primers in an amateurish sort of way over the past years and I think I long ago recognized that good primers were essential to maximum accuraucy. I have frequently torn them apart prior to and after firing, to try to determine what made some seem more accurate than others. I have weighed the mixtures before ignition and the residue after they were fired. It, of course, is perfectly clear that all physical characteristics such as the shape of the anvil, the uniformity of the metal in the cup

and the amount of the mixture, must be as close to uniform as possible. The report of Mr. Speer's ballistics department technician told me something that I was already aware of; namely, that the noise or bang of the primer was a poor measuring feature to determine its efficiency.

I have long felt that a primer that bounced the powder charge, and the bullet before it, part way down the barrel was a condition that contributed greatly to variations in accuracy. Readers can well recognize that if the detonated primer bumps the bullet one inch beyond the throat in one instance and two inches beyond it the next, there will be a tremendous difference between the density and power of the ignited powder gases at the time when they become effective on the base of the bullet.

It seems to me that the CCI development of a hotter and more steady and positive kindling flame, completely and uniformly igniting the powder well, while it is still contained within the restrictions of the cartridge case, is an especially valuable feature, on which I hope to receive dividends in my summer's shooting. In the short period that I have had these primers, I have had little time to experiment with them other than in a .219 Donaldson chamber and with my usual load of 26½ grains of 3031.

It seemed to me that this was the case to start with since my basis of comparison with previous loads is of long duration and of considerable breadth. I can also readily test such a case, using new CCI primers, in at least six different rifles. At this stage, I am elated because a new rifle gave remarkable results, an old rifle which has been a great favorite of mine shot better than it ever did before, and a varmint rifle seemed to shoot smoothly and nealry as fine groups as a heavy benchrest gun. I think that the new primer in combination with the progressive twist barrel will start a bullet on an accurate course with a smoothness and continuity of acceleration that is nearer the ultimate.

The wear at the throat of the barrel has always bothered me and although it is too soon yet to tell, it may be that the new CCI #205 primer may add length of life at that point. The theory has often been advanced that the greater barrel life when using ball powder is partly due to the fact that the spherical shape of the unburned powder elements flowing into and through the barrel is less abrasive thah tne sharp ends of the cylindrical type powders which also must be impinging on the lands of the barrel, and especially in the throat area.

One test which Mr. Speer's ballistician made, indicated that exceptional uniformity was obtained over a wide temperature range, even down to 70 degrees below zero. That's too far down for me and the little bit of southern blood in my veins rebels at the thought of such a low temperature.

I was impressed though with tests that gave such uniformity as only thirteen foot seconds variation through a series of experiments. That's down the bowling lane of the benchrest shooter, and another feature which opened my eyes was the great uniformity that was possible with cases that weren't packed tight with powder. We, in the benchrest game, have long known that there can be considerable difference in the point of impact of a bullet shot from a .219 case that is inserted in the chamber with the powder against the base of the case or against the base of the bullet. If you are going to get the best performance out of your rifle, don't insert one case into the chamber by hand and the next one by feeding it through the magazine lips or rolling it into the boltway.

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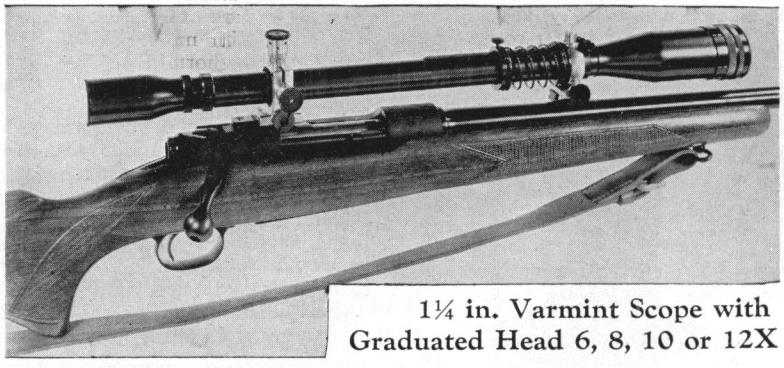

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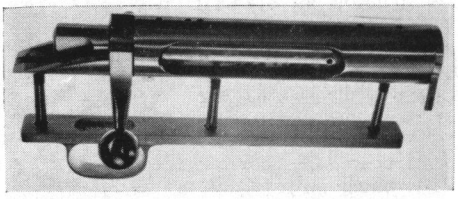
I can't go along with the shooters who feel that the hobby is reaching the saturation point. It is my firm conviction that the future holds a whole series of new developments in the missile age which is upon us. To me, the jet age did not seem to be too closely allied to marksmanship but the missile development seems to me to be very closely akin to our pet sport.

We have, over recent years, through a careful refinement of gunwork and in combination with our telescopes and rest facilities, developed a mighty efficient launching device. The careful and uniform steps which we take in making and assembling our components is, in effect, the equivalent of the count down systems in missilry. We have already gone to electric triggers in some of the experiments but they are probably crude and cumbersome compared to the devices we shall see in the future at the rate at which micro electronic gadgets are being developed.

As I mentioned earlier in this column, a delicate balance of new high energy fuels and oxidizers has been assembled to release a larger amount of heat over a more extended period of time. After all, powder as we know it today is a form of progressive burning solid fuel. With the billions that are being spent on the development of the Polaris and other missiles which are using the energy of the new solid fuels, we cannot help but reap a dividend in the form of more modern and uniform equivalents of powder. It may be that soon, we shall run strips of fuel in wire form through cutters similar to those we use cutting our lead cores in bullet making and come out with a little slug that drops in to a slightly longer than our current model bullet jacket, prior to our placing and swaging the core

(Continued on Page Fourteen)



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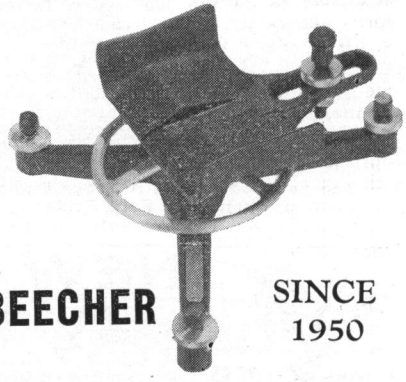

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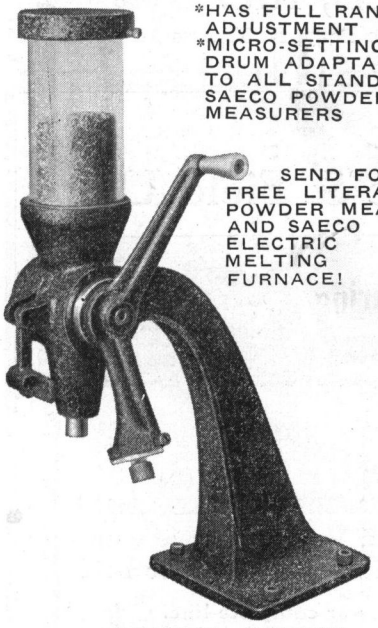

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(Continued from Page Thirteen)

and jacket to projectile shape. The projectile starts on a flight through a launching device similar to a rifle but with longer and thin walled barrel. The jacket base would be of a nozzle shape whose solid fuel mixture is reached through a tiny nozzle orifice which is in turn ignited by a pea sized micro electronic device which takes the place of a long stroke, slap-happy bolt as we know it today with all of its bulk and manufacturing problems and faults, relegated to the ages of past history.

Perhaps this sounds like Jules Verne to you but I am more serious than you think. Through dreaming and scheming and doodling, I am fully convinced that these goals are reachable. The demand for lighter weight weapons seems to increase and I speak from experience when I say that added years makes such developments progressively alluring.

These dreams of mine are perhaps like those of all dreamers who with few exceptions are forced to continue with them through lack of funds. What I need is a Federal grant, since at the moment my funds have been liquidated by too many benchrest guns. I'll bet you fellows can just hear Merrie Stuhlschuter saying "Amen" to the above as she types it.

Cordially yours,

Ernest Stuhlschuter

A .224 NEWTON

Dear Phil:

I have that ".224 Newton" finished. Stocked with butternut, with high comb, the stock weighs just one pound. The scope is a Redfield 2¼ X Bear Cub. Barrel is a light 24" sporter, .525" at muzzle, made from a .224, 8 inch twist Buhmiller blank. Action is a Model 70 Winchester. The rifle weighs 7¼ pounds complete with scope.

The case is the same as the old .22 Newton, excepting that the neck is about .004" smaller to take the .224 bullets instead of the old standard of .228", and the throat will take care of the 90 grain bullets. It is just a light weight woods hunting rifle.

Now for the velocities I get, using the pendulum chronograph:

H450 powder	Bullet	Velocity
42 grs.	90 gr. Hufnail	2920 f/s
43 grs.	90 gr. Barnes	2920 f/s
45 grs.	90 gr. Hufnail	3136 f/s
45 grs.	90 gr. Barnes	3100 f/s
45 grs.	75 gr. Hufnail	3230 f/s
47 grs.	75 gr. Hufnail	3340 f/s
HiVel #2		
23 grs.	70 gr. S. P. swaged	2130 f/s
22.5 grs.	63 gr. Sierra	2400 f/s

The two last loads are what I might use for turkey, or head shots at squirrel.

Pressure for the load of 45 grs. H450 and 90 grain bullets was similar to that of the standard .270 WCF load. All the rest were lower. The groups were mostly from a little under one inch to inch and a half with the better loads. The 90 grain bullet load shot the better in the full load class, although the 75's were perfectly satisfactory.

I have also done a little shooting with cast gas-check bullet loads, and for some reason they shot better in this rifle than I ever had them in a Hornet, Swift or Varminter. I did not expect them to do so well in this quick twist. My best load was 7.5 grains of DuPont bulk shotgun smokeless and Ideal bullet No. 225450, or a very similar bullet made up by V. Gipson. Gipson also made up the reamers for this cartridge.

One thing that might make these rifles shoot so well with cast bullets is the throat. It is cut with a standard throating reamer of a degree and a half on a side, included angle three degrees, but its maximum diameter is only .224". So, no matter how deep it is run in, the throat never is more than groove diameter. The throat is deep for the 75 and 90 grain bullets, but the cast bullets are seated rather shallow in the case, are pretty nicely seated into the throat, and they will contact the rifling slightly. The bullets are also swaged in an old RCBS bullet swage after they have been run through an Ideal sizer and lubricator (but not sized much), the grooves well filled with lubricant, and a gas-check attached. The swaging does not close up the lub. grooves, but does reform the bullet and firmly put the gas-check in place.

A lot of the loads I shot for accuracy were not chronographed. I do not like to change the sights on a hunting rifle, so I have been trying to get a "turkey load" that I can use with full load sighting; say with the full load shooting 2 inches high at 100 yards, and the lighter "turkey load" shooting to center at the same range. I have just about got it.

By the way, a turkey takes some killing. Seldom will a bullet stop one on a body shot that does not break both a wing and a leg, or hit the back bone, unless it makes a hole at least an inch in diameter through the bird. The Hornet with soft point bullets is just about the lightest load that is at all reliable. Full jacketed bullets will not stop one turkey out of ten. I want a soft point bullet in .22 or .25 caliber that will open up, but not blow up, at velocities around 2400 to 2600 f/s. The Barnes copper tubing bullets are very good at the higher velocity. I also like the 105 grain Speer in 6 m/m at around 2400 f/s. Either of these loads are fine for squirrels if they are shot in the head or neck, and that is not hard to do from a steady position. Of course an accurate cast lead bullet load is ideal for squirr,els, **but** it generally takes a change in sight setting.

Byron E. Cottrell
Galeton, Penna.

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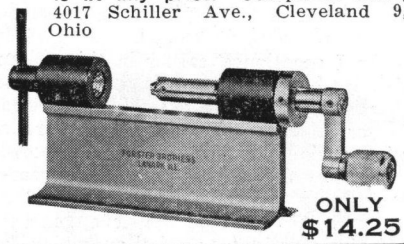

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Hollow Point Bullets

(Continued from Page Three)

The longest shot I ever made at a deer was made with this kind of a bullet, arsenal loaded ammunition, .30-06. Range was 700 yards. Buck was bedded down, and did

not get up. Used a 10X Lyman target 'scope. (Editor's comment: Before anyone starts sending in caustic comments regarding shooting deer at up to 700 yards, let me say that after seeing that Pennsylvania topography, and learning how that shooting is done, I am convinced that it is a reasonable feat, under those conditions. It is essentially long range shooting **from rest,** frequently as a two-man team with one man at a spotting scope to spot hits while the other shoots. The terrain, steep parallel ridges and narrow valleys, makes the long range observation and shooting quite feasible and familiarity with the area permits close estimation of ranges at which game is located. Success does, of course, require an experienced and capable rifleman.)

Back around 1927 a friend of mine killed a buck with a 110 grain Western Tool & Copper Works bullet (small hollow point) in a .30-06 Springfield NRA Sporter. Load was given me by DuPont that would give 3500 fps. They cautioned me to use known good cases and a rifle in good shape; the load was 60 grains of old No. 16. This deer was shot at around 50 to 60 yards, and showed no signs of a hit, ran nearly 100 yards and fell **dead.** Bullet cut off four ribs on entering, and not a piece cut the opposite side of the rib cage. Never found any heart or liver; just a bloody pulp. Buck had just been eating a lot of small wild apples, swallowing them whole, and they were strung the whole length of the body cavity.

From Walt Bryn, Oroville, Washington:

Was much interested in your home brewed .30 cal. bullets with hollow point, especially the **145** grain. Brings back memories.

Some 20 years or more ago I was devoting all my spare time to the then unheard of game of benchresting, object being to find as much about the makings of accuracy as I could. I knew that the small calibers would naturally show up best due to less possibility of error in uniformity which would be inherent due to smaller size. But I liked .30 cal. best so worked with that in '06 bull gun (30" barrel). Tried all makes and weights of bullets, powders, primers and cases in all kinds of combinations and velocities. Did my best with a Remington **145 grain** Bronze Point bullet, FA cases, Win. 115 primer and 47.3 grains of HiVel. In average conditions I could depend on less than minute-of-angle at all times and much of the time less than half-minute.

I regret now that I did not cross section one of the bullets to find if the nose was filled with lead or if the bronze point was all alone there.

Please do me the favor of finding out from your Remington friends just how that bullet was made. And while you are at it, get some bronze points from them—just the points—and load them in your hollow, empty point bullets. Could be the next step toward the all-in-one-hole type of accuracy we are looking for.

From Bob Snowball, Montreal, P. Q.:

. . . . Would suggest you take a searching look at those hollow point bullets for game such as deer. On those soft chest shots, fine. A bullet that expands well is needed where nothing hard or even firm is struck on the way in. But what if you hit a heavy bone such as the hind leg bone? Will the bullet hold together enough to keep on going? At times the only shot to be had may be at the south end of a north bound buck, and once on the last day of the season I took such a shot as a first shot, not as a finisher. The bullet was a type which wouldn't hold together and it was a good (or rather bad) hour and a half later before I was able to get the knife to work.

(Editor's comment: My mention of the possible worth of hollow point bullets of **benchrest or accuracy type,** on game, and request for **experience reports,** was made because I felt that probably rather few people had tried them for this purpose. I was myself surprised at results from the only two experiences that I actually knew of. With very rare exceptions in the present day, no one person can hope to have enough firsthand experience with the performance of any one bullet on game, under the variable conditions of hunting, to form a basis for any firm conclusions. But reports of actual experiences from a considerable number of persons could help to reach some reasonable conclusions.

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(Continued on Page Sixteen)

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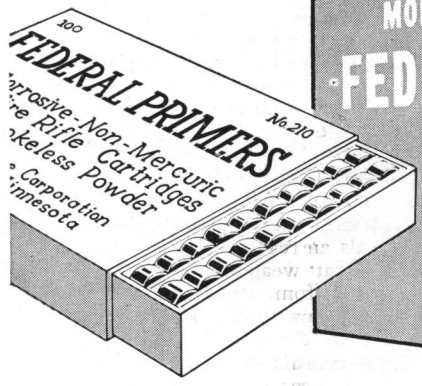

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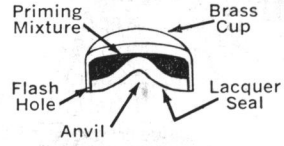

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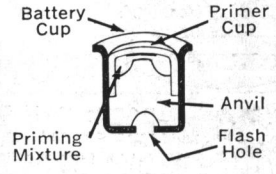

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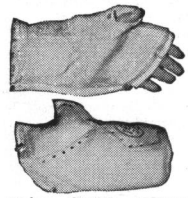

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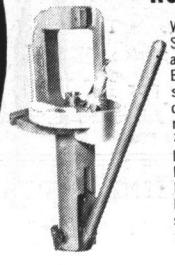

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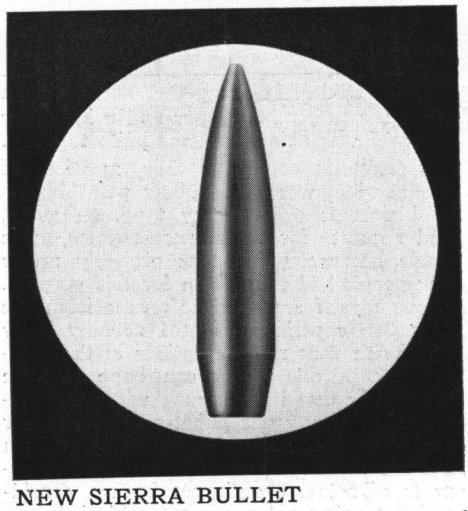
Hollow Point Bullets

(Continued from Page Sixteen)

hollow point bullet has been to obtain superior accuracy at the target. If, in suitable calibers for the game to be shot, they **may be** of worth as reliable game bullets, that will be an additional dividend. I don't know if there may be this dividend, or how big it might be, but I would like to find out. Theorizing and guesstimating won't provide the answers. Experience reports from a considerable number of people, over some extended period of time, could provide some "answers" that we might reasonably depend on.)



NEW SIERRA BULLET

Newest addition to the Sierra line of match bullets is the 190 grain Matchking Hollow Point, designed especially for long range match shooting.

Construction of the 190 grain Hollow Point is similar to the 168 grain International, the accuracy of which has been fully range-proved. It is stated that the new 190 grain bullet incorporates the ballistic advantages of the 180 and 200 grain Matchkings, with the inherent accuracy of the hollow point 168 grain International bullet.

NEW HORNADY PRODUCT

The Hornady Manufacturing Company have announced the availability of .30 caliber half-jackets and lead cores for making 110 grain bullets, presumably in the C-H Swag-O-Matic equipment. The cores are apparently swaged for a proper fit in the half-jackets. Combined cost of the jackets and cores would be $19.25 per M.

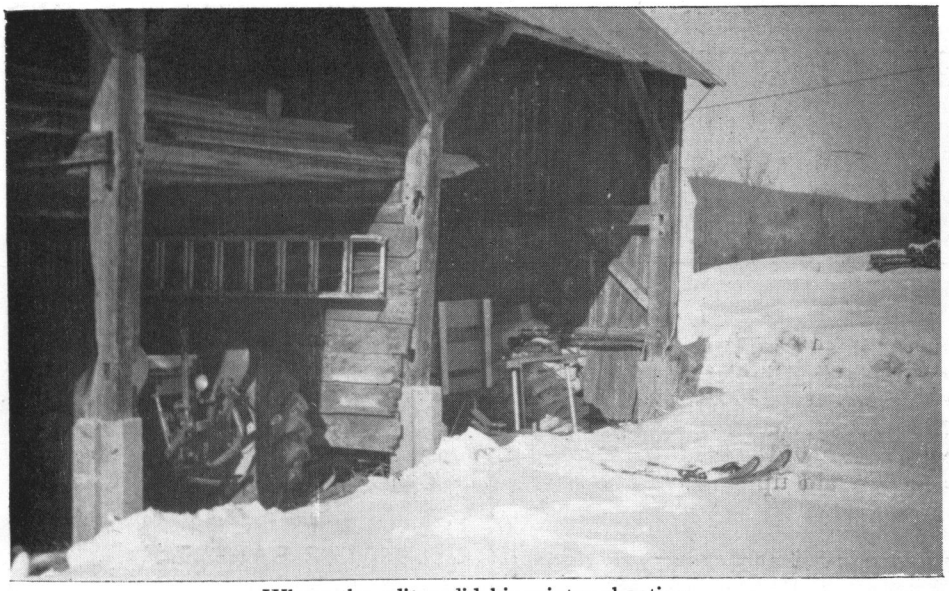
COLD WEATHER SHOOTING

Phil Teachout

I have for the first time been shooting outdoors throughout the past winter, and have learned some things from first-hand experience.

Have found that by dressing as I would for late fall or early winter deer hunting that I can be quite comfortable for several hours shooting in temperature down to 20 degrees above zero, PROVIDING there is a wind-break for the firing point. Shooting toward the south is a comfort feature on sunny days. Bare fingers are the first to suffer from the cold and one of the little Jon-e pocket hand warmers helps get them warmed up.

First problem was a place with a sheltered firing point that could be conveniently reached throughout the winter. An open-front machine storage shed with a southerly exposure on a son-in-law's farm had space enough left to set up my portable shooting bench and his meadows provided ranges longer than I wanted to tramp



Where the editor did his winter shooting.

to hang targets. The nearby kitchen stove provided a place for a real warming up, but I didn't find much need for that added convenience. Snowshoes were used for going to and from the targets during the deeper snow season. In spite of the coldest January that we have had here in many years, I missed shooting in only one week during the winter because of weather. Afternoon temperatures of 20 to 30 are fairly normal, even in extended cold spells.

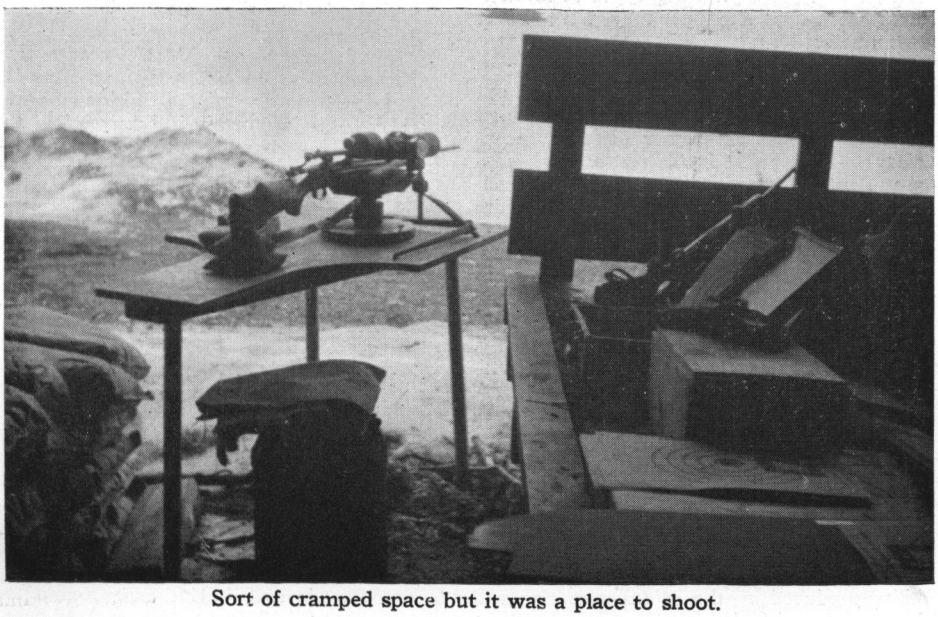
Shooting under these conditions, with starting gun and ammunition at outside temperatures, gave true cold weather shooting conditions. I did not find any significant difference in accuracy between this cold weather and normal summer temperature shooting, with any of my rifles and loads. There does appear to be a lower point of impact in this winter weather, but unfortunately I did not make notes as to just how much.

There was not the mirage sighting trouble that is experienced in shooting through ports from a warm shooting house. However, mirage from a warming barrel interfered with accurate scope sight aiming after 5 shots from light barreled sporter rifles, and before 10 shots were finished with heavy "bull" barrels. It didn't take long between strings for barrels to fully cool.

Wind judging were pure "guesstimating." Small, temporary, makeshift target butts and the snow-white background didn't show any mirage that I could see, and the wind sheltered firing point didn't give any "feel" aid for wind judging.

Some opinions I have tentatively formed are: Location of a suitable place to shoot that may be conveniently reached throughout a winter season would be the number one problem for a winter shooting spot. A three sides and roof wind-break shelter for a one or two person firing point would be relatively inexpensive to construct. It could be of reasonably light construction, and could be of sectional construction for disassembly and storage when not in use during the summer. But if the site could also be used during the summer, the sheltered point would be a convenience for all-weather shooting.

If power-line electricity were readily accessible to the firing point, I would suspect that one of the infra-red heating lamps would permit really comfortable shooting, in even lower than 20 degree temperatures. Construction of such a simple sheltered firing point, with infra-red heating, for a small group of shooters should be possible at no very outrageous cost. For some established club outdoor ranges, where a heated clubhouse were available, a simple sheltered winter firing point should be quite a practical addition to facilities, be relatively inexpensive, and add considerably to the shooting activity program.



Sort of cramped space but it was a place to shoot.

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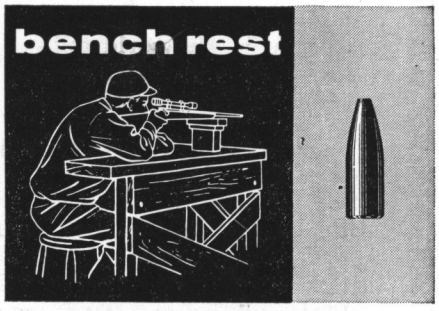

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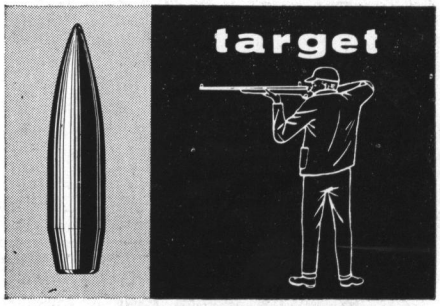

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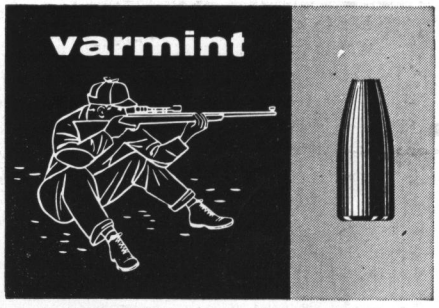

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Postscript to "More About Bullets"

(Continued from Page Nine)

Question: How is an incendiary bullet constructed?

Answer: .30 caliber incendiary bullets were of two types. Both are now outlawed and no longer manufactured because they act somewhat like soft point sporting bullets. The earliest American types manufactured in quantity were copied from German designs. They consisted of a copper alloy jacket partly filled with incendiary material (a sort of combination magnesium and primer mix). A body consisting of a hollow steel core was pressed in upon this mixture and the base sealed with a lead plug. Of course, the jacket was firmly crimped in place. However, this bullet was extremely inaccurate because the canalure was rolled into the jacket after assembly instead of cut. When you roll a piece of metal against a non-yielding surface you make it larger (like rolling out a pie crust) and when the metal rolled is in the form of a tube, the cylinder increases in diameter. Rolling the jacket pulled it away from the core and you can guess what might happen when a bullet with a loose core is fired. Earlier and more primitive types of incendiaries were available but they were never manufactured in quantity.

The most successful .30 caliber incendiary bullet was that which was turned out during Korea. It was a combination bullet referred to as API (armor piercing, incendiary). This bullet had a rather thick coppre alloy jacket partly filled with an incendiary mixture. An armor piercing core (shorter than the standard AP core) was firmly pressed in upon the incendiary powder. The base was sealed in the conventional manner. This construction produced a bullet point that was filled with a light weight material followed by a heavier body. 600 yard accuracy tests at Twin Cities Arsenal with this bullet always produced superior results when compared with standard ball bullets. The concensus of opinion credited the improved accuracy to the light weight point although a few held that the use of a jacket material heavier than the core also contributed towards uniform results. In other words, if the rim of a wheel is heavier than the spokes and hub, the stability produced by the spinning motion will be more satisfactory. Fred W. Hallberg

LETTERS

LONG RANGE RIFLES

Dear Phil:

I noted with interest Fred Hallberg's article on long range rifles in January Precision Shooting. I agree that it is more desirable to lower the front sight, rather than raise the rear, when large amounts of elevation are needed. If one is willing to sacrifice about 1 5/16" in sighting radius, one can mount a lower block to mount the Redfield International front sight. This will permit the sight to clear the front block. On .300 Magnum bull guns, which are used only at 1000 yards, I would see no need to make the rifle zero at 200 and 300 yards.

LOAD TESTING: We had good shooting weather in the early part of February. I loaded 15 cartridges each with the new Norma 187 grain B. T. match bullets and the 168 grain Sierra International. The Schultz & Larsen .308 Free Rifle was fired prone off sand bags at 200 yards. Using 41 to 42½ grains H380 and Cascade primers with the 187 grain Norma, the 5-shot groups were 2", 1½" and 1 5/16", the heavier charges shooting better. The 5-shot groups for the 168 grain Sierra were 1 3/16", 1 1/16" and 1", with loads of 42 and 43 grains H380. These were the first loads tried with these bullets. Powder was measured. The Schultz & Larsen forearm is too narrow to be ideal for use off sand bags.

Donald A. Holmes
No. St. Paul, Minn.

WANTS INFORMATION

Dear Phil:

During the War the rumor had it that the ersatz solder we were issued in the field service Ordnance units was practically devoid of tin and contained from ½ to 1% of silver. The stuff behaved quite differently from 50-50 or 70-30 lead-tin solder. It had little affinity for steel, even with acid flux, and had a higher melting point than either of the solders mentioned. It seemed at least as hard as 70-30 lead-tin but was apparently more ductile. (At least it didn't have the characteristic tinkling crackle when bent.)

These properties, coupled with the facts that silver is within about 5½% of being as heavy as lead and that very little is needed for the purpose, would indicate that a high lead—low silver alloy might make a good bullet or bullet core material.

Maybe some enlightened reader has experimented with such alloys or is qualified to perform one of the Spiritual Works of Mercy by instructing us ignorami in the properties and characteristics of high lead—low silver alloys. There doesn't seem to be much on the subject in readily available literature.

Dermot Reilly
Albany, N. Y.

GLASS BEDDED SPRINGFIELD

Dear Phil:

A couple of years ago I sent you an article on a Springfield rifle that I rebedded, a two groove barrel, as issue, etc. etc. At that time I fired my own swaged caliber .30 bullets. I have again taken an issue Springfield, completely re-bedded it in a cutoff stock, again using plastic bedding full length of the barrel, and fired it today from bench rest at two hundred yards and obtained (after sighting in with iron sights) seven shots in under 2¾", using Remington service ammo, 1957. As far as I am con-

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cerned, it all goes to prove that if the parts are at least good, and if the ammo is good, these rifles will shoot much better than the shooter can hold, provided that the barrel and receiver are correctly bedded.

Some day I want to fire this Springfield with a big scope and home swaged bullets and just find out what a run-of-mill Springfield with four groove barrel will actually do.

Mason Williams
Stanfordville, N. Y.

WEIGHING CASES

Dear Phil:

. . . . While I can't claim to have started anything, I am amused and at times amazed at what people are finding out by weighing their empty shells. Some rival the enthusiastic claims of a patent medicine salesman. If we would take the trouble to read page 63 of the 41st edition of Lyman handbook, we would find that Warren Page tells us to check case weights if we are interested in the best accuracy from our loads. But some swell heads like myself at times are above reading anything in the handbooks that looks as if it might be "general suggestions" or something for beginners. And then, Page writes in such an easy conversational way that I, at least, at times find it so pleasant reading that it is hard to pay close attention to every word. In my opinion, Warren Page has a fine fund of experience and knowledge and shows considerable skill in putting it down on paper, whether it be the printed word or bullet holes in a target. Shell weighing is far from new. Like so many things today, we seem to feel we have progressed to the point where we can neglect to bother about it.

BULLET BEHAVIOR: Have intended to write Harvey Donaldson for a little more dope on his tree shooting. I have heard more than once that when a bullet is pushed hard it hasn't always the penetration that it would have at a bit slower speed **or if fired at a bit longer range.** Usually when trying for penetration a person is liable to shoot from about as close as can safely be done to avoid back splash, etc. There is something about bullet yaw, or something. I know that a spitzer full metal patch shot through a bag of water 6" or more in diameter has always hit a cardboard **side on** if the cardboard is between 2 and 6 feet or more beyond the bag. This with full loads. Cut the load to about half and the "keyhole" may not be complete. The shooting being at not over 25 feet. I used 170 and 180 grain .30 caliber bullets and it made no difference that I could see if the bullet had a light filler material in the nose (as our service used to have) or the core was solid to the tip of the jacket (inside). This was what I always found and I have tried the experiment several times. Now at 200 yards, the only time I tried it the bullet kept point on without any tip that I could detect.

CATCHING BULLETS IN SNOW: To check for slipping on the lands (start of stripping), gas cutting and bullet upset in the barrel, I fired some more gascheck bullets from my 458 magnum into a soft snow bank. This was several weeks ago and I recovered some of them yesterday. Some were unmarked by their trip and those that were probably met up with some odds and ends of rubbish in the snow. It seems a little strange to me at times that 20 feet of soft drifted snow (not packed or melted and frozen) would stop a 500 grain bullet from 1950 f/s velocity.

Bob Snowball
Montreal, P. Q.

CAN YOU HELP?

Dear Mr. Teachout:

. . . . I am still fascinated by the many things that can go wrong with an accurate rifle; scope, bedding, locking lugs, etc., etc. My own experience is that occasionally I tune a rifle to acceptable accuracy in the terms you speak of, only to have it go sour the next day. I get the general impression from most of your writers that they get a rifle going and it shoots ½ inch groups or better from then on forever. Of course I am well aware that is not so, but who ever mentions it?

How do other people make out with a 722 Rem. .222 in terms of keeping gilt edge accuracy once achieved? I would be interested to hear about this.

Parkman D. Howe, Jr.
Concord, N. H.

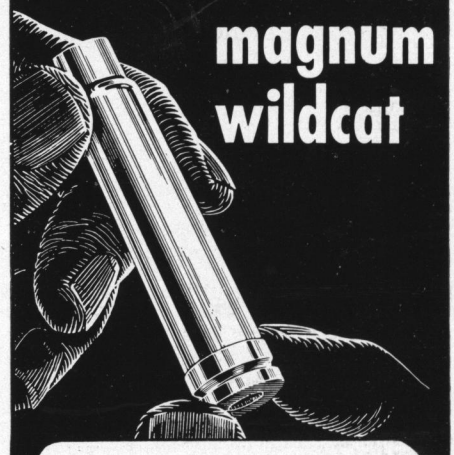
.22 RIMFIRE BULLETS

Dear Phil:

. . . . Regarding present day small bullets, I have found the diameters of .22 match bullets, both Western and Remington loadings, to be noticeably smaller over the past two years than they were over a period of several years just preceding. But, going back to the days of Lesmok, I find among my ammunition samples a box of Winchester Precision 200, Lesmok powder, in which bullet diameters are barely groove diameter—.222". This smallness evidently was justified in the fact that Lesmok burned and upset bullets about like black powder did, and besides diminished apparent bore diameters with its caked fouling.

Jesse M. Grigg
Chicago, Ill.

the norma man tames the .308 magnum wildcat



"For more velocity, I've tried necking, fireforming and altering .30 caliber cases for years," he says, "but not any more. The brand new .308 Norma Magnum unprimed case is just what this handloader ordered . . . and I'll bet a lot of others will feel the same way!"

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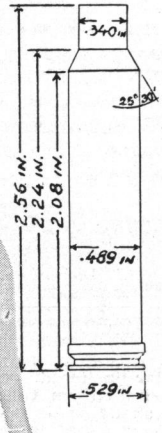

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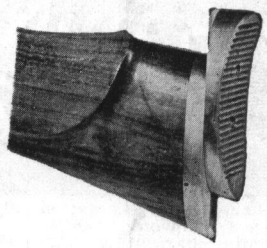

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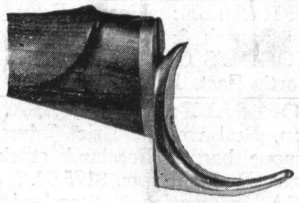

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